Mediterranean Coast Network
Biological Inventory
Study Plan

Prepared for

The National Park Service

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I. INTRODUCTION

I.A. Project Background

The National Park Service's primary mission is to conserve unimpaired the natural and cultural resources and values of the national park system for the enjoyment of this and future generations. Currently, the NPS is unable to attain this mission because it lacks basic information on resources within its parks, particularly the status and condition of biological resources. To address this lack of information, the National Park Service created the Servicewide Inventory and Monitoring (I&M) program. The primary goal of this program is to provide park managers with comprehensive, scientifically-based information about the nature and status of selected biological resources. The

information gathered in the I&M program is to be used for making management decisions, for conducting scientific research, and for educating the public. Additionally, the inventory work is and will be designed and conducted to facilitate future monitoring in the parks.

In 1999, all parks within the National Park System were directed to develop study plans to identify inventory needs. These plans are to present the status of current knowledge in the parks, identify gaps in existing information, identify specific park inventory objectives, and recommend field surveys or other studies to close those gaps. Parks were organized into 32 biome-based networks that share similar resources and management issues. Each network was tasked with developing a study plan for conducting inventories in the parks within its group. Each network was directed to assemble a group of experts to help develop the study plan in a workshop format. Initial efforts focused on vascular plants and vertebrate fauna only, as directed by Congress.

This study plan provides the National Park Service with a strategy to improve its knowledge of vascular flora and vertebrate fauna in the Mediterranean Coast Network of parks. The document contains an overview of the Mediterranean ecosystem, a description of the Mediterranean Coast Network's inventory efforts to date, additional studies required to achieve park specific inventory objectives, and detailed budget and logistical information required to implement the plan.

The objectives of this study plan are to:

(1) Establish a baseline inventory of all vascular plants and vertebrate fauna by conducting a thorough review of existing data sources including museum records, voucher specimens, previous studies, park databases, and herbaria.

(2) Use this information to populate the nationally standardized database developed by the National Park Service known as NPSpecies.

(3) Identify and implement additional studies to gather more information on poorly documented/understood taxonomic groups or species.

Document content and inventory priorities

The large number of species and diversity of habitats in the Mediterranean Coast Network made the development of a detailed study plan for each taxa prohibitive within the given time constraints. Therefore, we took the approach of (1) developing detailed study plans and budgets for work to be completed the first year and (2) providing more general study plans and cost estimates for work to be completed in successive years.

Some of the project descriptions in this document are more detailed than others. These were chosen as the highest priority and are discussed in Section IV.B. A complete project completion schedule and list of the criteria used to determine priorities are also presented in Section IV.B.

Descriptions of projects scheduled beyond the first year are less detailed. We anticipate that these will be developed more fully during annual coordination meetings with additional refinement by the investigators who will be conducting the research. In most cases, we tried to provide broad guidelines rather than detailed instructions on how to conduct the studies. This approach provides maximum flexibility necessary for study design and budget allocation.

Fully implementing all of the projects described in this plan exceeds the funding amount available for the network from the Inventory and Monitoring program. Although all projects and cost estimates have been retained in this plan, zero or reduced funding is requested from the Inventory and Monitoring program for the lower priority projects scheduled for FY2003 and FY2004. The network anticipates that other funding sources will be found for these unfunded projects or portions of the funded projects (thus freeing up funding for later, originally unfunded projects). The network plans to pursue a variety of other funding sources, including cooperating association grants, university-based grants, private foundations, park-based funding, and other National Park Service sources (e.g. Vital Signs Monitoring funds may help support portions of some projects).

I.B. The Mediterranean Coast Network

The Mediterranean Coast Network is comprised of three parks – Cabrillo National Monument, Channel Islands National Park, and Santa Monica Mountains National Recreation Area (Figure 1). Summary statistics for each park unit are shown in Table 1.

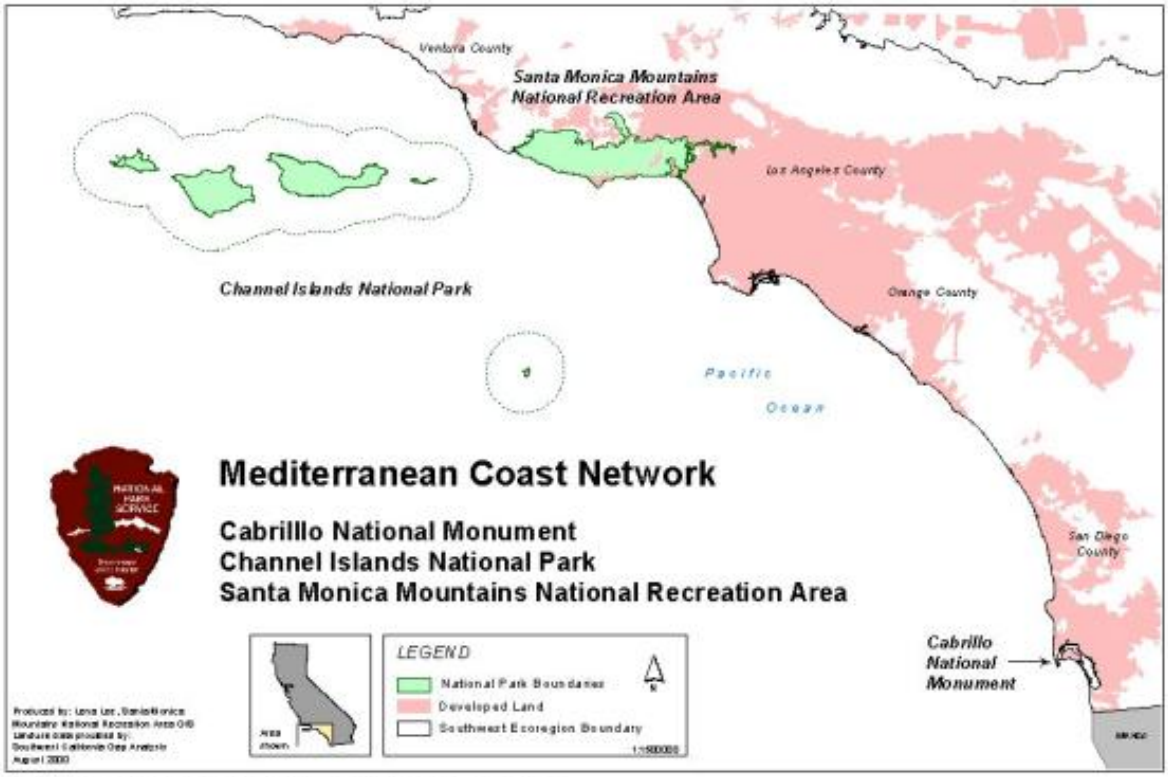

Figure 1. Regional map of the park units in the Mediterranean Coast Network.

I.B.1. The Mediterranean Ecosystem

Five regions around the planet have climates identified as “mediterranean” coastal. This climate type occurs on about three percent of the world’s total land area (World Conservation Monitoring Centre, 1992,) in zones located between 30 and 45 degrees latitude along continental coastlines. Mediterranean climates are characterized by mild, rainy winters and hot, dry summers. Two of these regions are found in the northern hemisphere and three in the southern. The North American continent has only one such area, comprising most of California and including the northwest tip of Baja California. This region represents 10 percent of the worlds’ mediterranean climate area (Dallman, 1998).

Table 1. Summary of park units within the Mediterranean Coast Network.

Park Unit	Acronym	Date of Establishment	Size
Cabrillo National Monument	CABR	October 14, 1913	- 117 ha managed by NPS - 259 ha co-managed by NPS
Channel Islands National Park	CHIS	1938: Portions established as a National Monument 1980: Acreage increased; status changed to National Park	100,449 hectares
Santa Monica Mountains National Recreation Area	SAMO	November 10, 1978	- 8,753 ha managed by NPS - 20,742 ha managed by other park agencies - 31,255 ha in private ownership

Coastal California is especially influenced by the cold water currents that run north to south along the coastline. These currents result in more fog and cooler temperatures on the coast than in inland areas, as well as lower annual and seasonal fluctuations in temperatures. In southern California, the Transverse and Peninsular mountain ranges serve to isolate the more rigorous, desert-like interior continental climate from the milder climate of the mediterranean coastal areas. (Mac, et al. 1998).

The coastal southern California region has been defined by Hickman (1993) as the Southwestern California Floristic Province (SCFP), comprised of sub-provinces called South Coast, Channel Islands,

Transverse Ranges and Peninsular Ranges. The SCFP region is particularly unique because of the overlapping ranges of several southern and northern marine and terrestrial taxa, the high percentage of endemic species and sensitive communities (relative to other areas) and the occurrence of increasingly rare habitat for migratory birds and marine mammals.

The southern California bight (SCB) is an ecologically unique area of nearshore Pacific Ocean, comprising of coastal waters starting at Point Conception and continuing through the San Diego area. Marine life is especially diverse in the SCB due to the California and Davidson currents meeting and mixing the waters. The convergence of these two currents, coupled with upwelled nutrient rich waters around the Channel Islands and Point Loma, provides conditions that promote high species richness and diversity in these regions.

The predominant weather patterns in the SCFP are exaggerated mediterranean patterns: short, mild, rainy (highly variable) winters and long dry, warm to hot summers. Temperatures range from 13 degrees Celsius in the winter to 23 degrees Celsius in the summer, with an average annual temperature of 18 degrees Celsius. Average precipitation is 26 cm (10 inches) in San Diego, 37 cm (15 inches) in Los Angeles and 46 cm (18 inches) in Santa Barbara. Elevation varies widely from more than 1,524 meters (5,000 feet) below sea level west of the Channel Islands to over 3,505 meters (11,500 feet) in the Transverse Range. Within the three National Park Service units, elevation ranges from 732 meters (2,400 feet) below sea level in park waters offshore of Santa Cruz Island, to 948 meters (3,111 feet) in Santa Monica Mountains with Cabrillo falling in between. Rainfall can also vary widely from year to year, depending on elevation, as well as global climatic factors, such as El Niño events. Extended periods of drought are also not uncommon (Dallman, 1998).

The vegetation found in the SCFP is the result of Mediterranean climate patterns and general topography. Common plant communities predominately include coastal sage scrub and chaparral, as well as oak woodland, oak savanna, riparian areas, introduced annual grassland, native perennial grassland and dune communities. Coastal sage scrub communities thrive near the Pacific coast, usually occurring from the coastal area to a few miles inland. Coastal sage scrub is divided into several regional sub-types, many of which are sensitive. Chaparral covers approximately five percent of California (Rundel, 1986), and occurs mainly in southern California in areas that receive about 30-65 cm (12-25 inches) of rain per year (Dallman, 1998). Common chaparral community types in coastal southern California include chamise chaparral, scrub oak chaparral, and manzanita chaparral. Several chaparral sub-types are identified as sensitive as well.

As with other Mediterranean climate regions, southern California is favorable to human habitation and agriculture, as well as recreational activities. These human influences have dramatically affected the health of ecological systems, natural resources and individual species. The high degree of urbanization along the coastline has resulted in the loss of significant natural areas (Mac, et al. 1998). The scientific community, as well as the Park Service, realizes that biological inventories need to be conducted so future impacts can be measured against a known baseline.

I.B.2. Cabrillo National Monument

Cabrillo National Monument (CABR) is located within the city limits of San Diego, California, on the southern end of Point Loma Peninsula (Figure 2). The peninsula rises to a height of approximately 128 meters (420 feet) above sea level and is surrounded on three sides by the Pacific Ocean and San Diego Bay. CABR was established to commemorate the discovery of what is now the west coast of the United States by Juan Rodriguez Cabrillo on September 28, 1542. The park was established under the authority of the Antiquities Act on October 14, 1913, making it one of the oldest national monuments within the National Park System, older than the National Park Service itself.

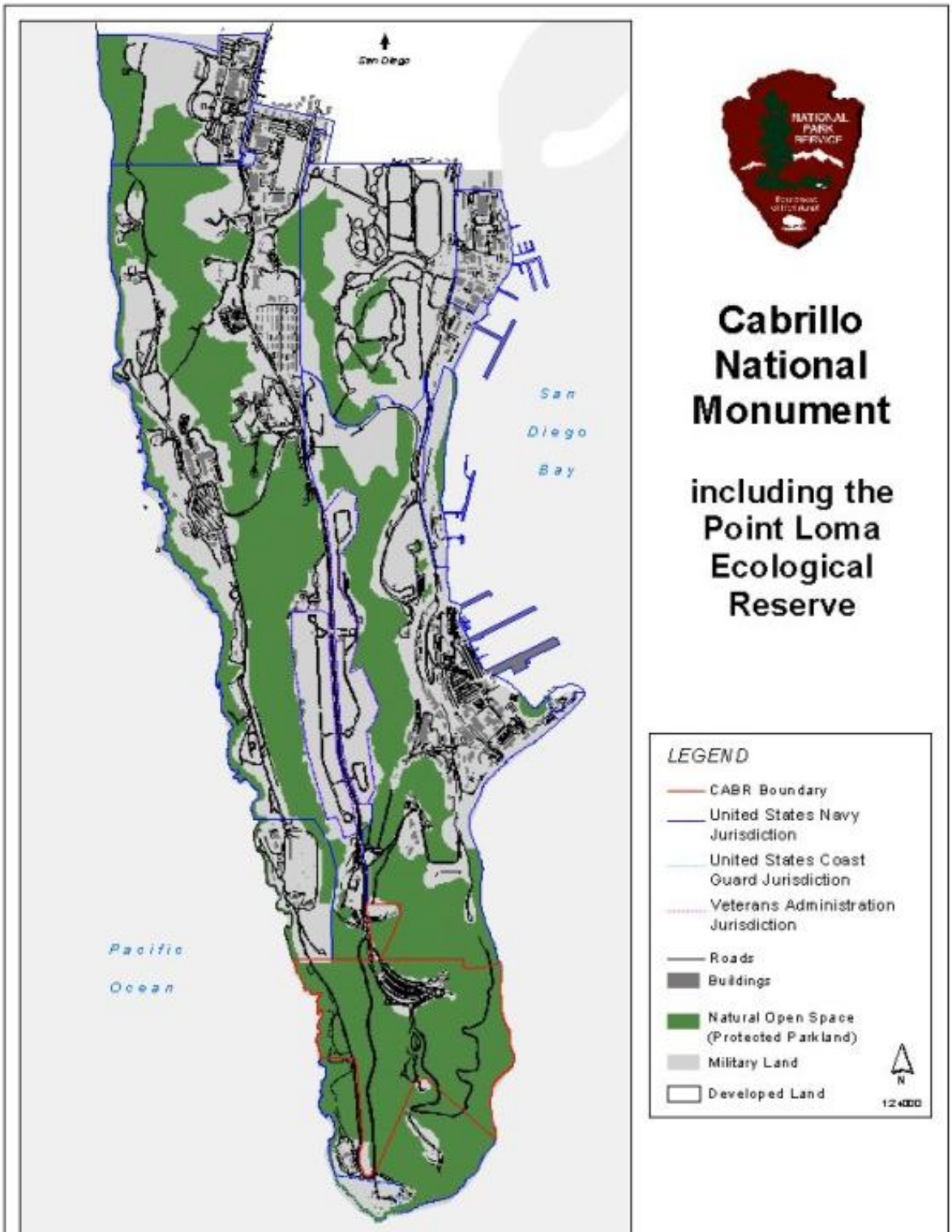

Figure 2. Map of Cabrillo National Monument.

Originally 0.2 ha (½ acre), the monument now contains 65 ha (160 acres) and is an area of exclusive jurisdiction within 607 ha (1500 acres) of federally owned land. The park also administers 52 ha (128 acres) of marine intertidal area on the west and southern end of the park from the mean low tide to 274 meters (900 feet) into the Pacific. CABR is part of the 259 ha (640 acre) Point Loma Ecological Reserve (PLER), established by nine landowners in 1995 under an agreement with the U.S. Fish and Wildlife Service (USFWS) to preserve this sensitive terrestrial habitat in perpetuity. The NPS co-manages this reserve with the United States Navy. As co-managers, a park goal is to broaden inventories to include all of the PLER. Without this information, "ecosystem management" is not feasible given the small acreage of remaining natural habitat, the high degree of connectivity across PLER ownership lines, and the pervasive influence of human activity on this heavily visited area.

Point Loma's terrestrial ecosystem occurs within the sixth largest city in the nation. It is isolated from other natural land by the ocean and surrounding development, forming an effective island of rare habitats. Many habitats on the peninsula have been recognized as globally endangered and extremely endangered by the Natural Resource Diversity Database (1992) and include such communities as maritime succulent scrub, coastal sage scrub, and maritime chaparral. Nevertheless, the integrity of much of the coastal sage scrub community here is still high. Its protection as a federal reserve, where private development is not allowed, and restriction by the Department of Defense to authorized personnel only, has limited public access to just a small portion of the peninsula. Additionally, the intertidal area bordering the southwestern end of the park is one of the richest and most diverse tidepool areas remaining in San Diego county. Just off-shore, outside of the park boundary, lie the Point Loma kelp beds, among the best studied kelp bed systems in the world. Unfortunately, San Diego Bay, bounding the peninsula on the east, has been listed as the second most polluted bay in the nation. Together, over 1000 species of organisms, including over 80 sensitive species, reside in the marine and terrestrial environments of Point Loma. These rich resources must be carefully studied, along with the ecosystem response to isolation, fragmentation, and stress, so that we can apply new knowledge to improve reserve management of Point Loma and the ever increasing number of ecological "islands" of rare habitats across the nation.

Reptiles, amphibians, small-mammals, invertebrates, rocky intertidal organisms, vascular plants, rare plants, lichen, and birds have been inventoried at CABR. The quality and extent of these studies are highly variable. Most existing inventories have been conducted for presence/absence data. Exceptions include the reptile and amphibian work, which include distribution and relative abundance, and rare plants, which includes rough distribution data. Mammalian carnivores, breeding birds, and bats have all been studied in the last decade, but not as complete inventories, so these taxa may also merit supplemental inventory work.

The primary inventory objective for CABR is to determine the general distribution and abundance for all vascular plants and vertebrate animals. A more detailed inventory is needed for species of special management interest, such as invasive exotic plants, threatened and endangered species, and herpetofauna.

I.B.3. Channel Islands National Park

Channel Islands National Park (CHIS) is part of an island chain lying just off California's southern coast (Figure 3). The five park islands, Anacapa, Santa Cruz, Santa Rosa, San Miguel, and Santa Barbara, and their surrounding 1.85 kilometer (one nautical mile) of ocean comprise CHIS. These islands and the adjacent submerged lands were set aside as a national park because of their outstanding and unique natural and cultural resources. CHIS was designated an International Biosphere Reserve in recognition of its genetic diversity and importance as an environmental baseline for research and monitoring. Additionally, Congress declared the waters surrounding the park islands out to six nautical miles as a National Marine Sanctuary.

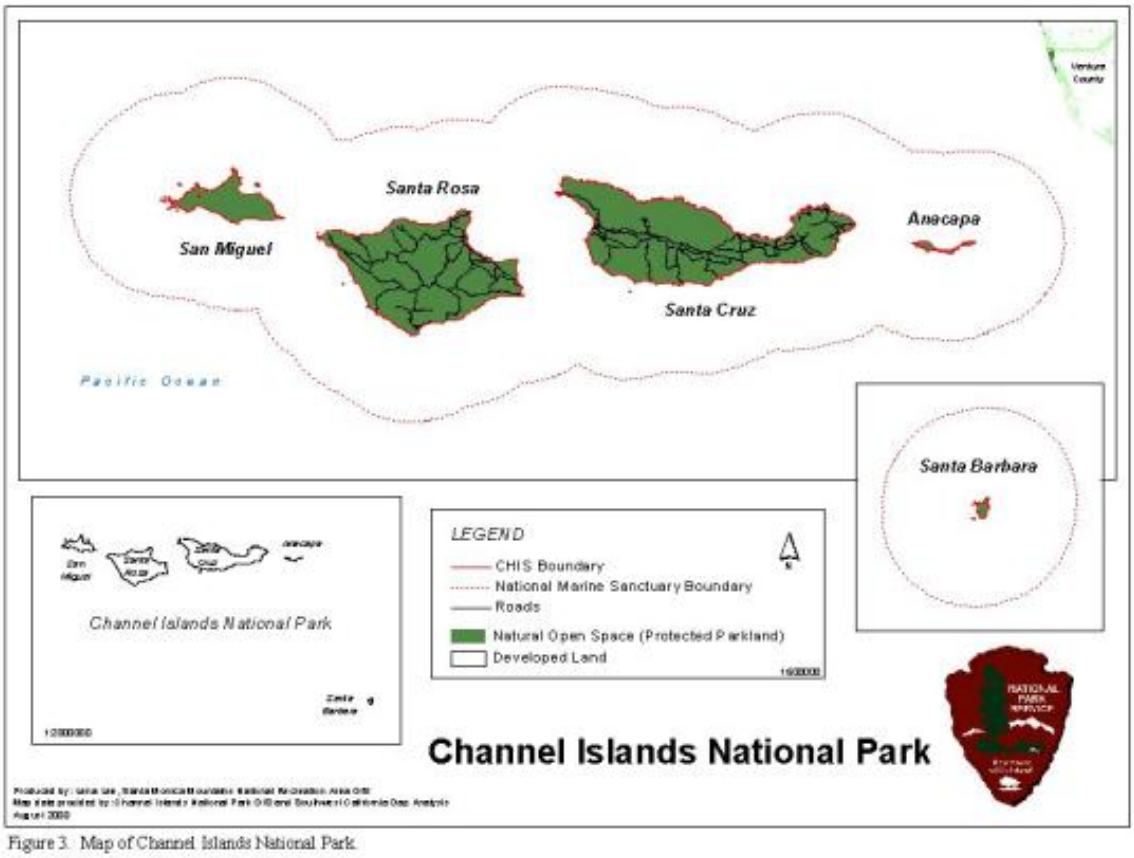

Figure 3. Map of Channel Islands National Park.

Prior to being named a national park in 1980, the land and water around the Channel Islands were designated as a national monument in 1938. Currently, the park encompasses approximately 101,215 ha (250,000 acres) which is roughly equally divided among land and water.

The park's significance with respect to natural resources lies largely in the isolation of the islands. This

has resulted in the evolution of numerous species, subspecies, or varieties of unique flora and fauna, and brought about unique assemblages of species in habitats or ecosystems due to missing mainland forms or the presence of island endemics. The island ecosystems are often "simpler" or less diverse than those on the mainland, while providing habitat for species that may occur nowhere else. The physical difficulty of human access to the islands has provided some amount of natural resource protection. For the latter reason, several of the species of marine birds and mammals which once commonly bred along the southern California coast now breed only on the Channel Islands.

The presence/absence of vascular plants, terrestrial vertebrates, land-birds, seabirds and pinnipeds are known for each island, but at a relatively coarse geographic scale. Current gaps include information on relative abundance of terrestrial mammals, reptiles and amphibians in different habitat types, and information on distribution of marine vertebrates (fish). Information on distribution and abundance of rare plant and animal species is also lacking. Due to endemism, isolation and the vulnerability of island populations to human impacts, many of the vertebrates and several plant species are of special concern. Detailed inventory information is generally lacking for these species.

The primary inventory objective for CHIS is to increase the level of resolution for inventory of vertebrates and vascular plants. The inventory status needs to move from simple presence/absence data for each island to detailed distribution and abundance data, particularly for species of special concern.

I.B.4. Santa Monica Mountains National Recreation Area

The Santa Monica Mountains National Recreation Area (SAMO) exists today as a mosaic of different land ownerships and land uses extending over 60,750 ha (150,050 acres) (see Figure 4). Of that amount, 29,495 ha (72,850 acres) are currently in protected status through public ownership (8,753 ha, approximately 21,620 acres, are owned and managed by the NPS), with the remaining 31,255 ha (77,200 acres) in private ownership. Unlike most national parks, SAMO is still expanding as remaining open space parcels become available and are purchased as public park land.

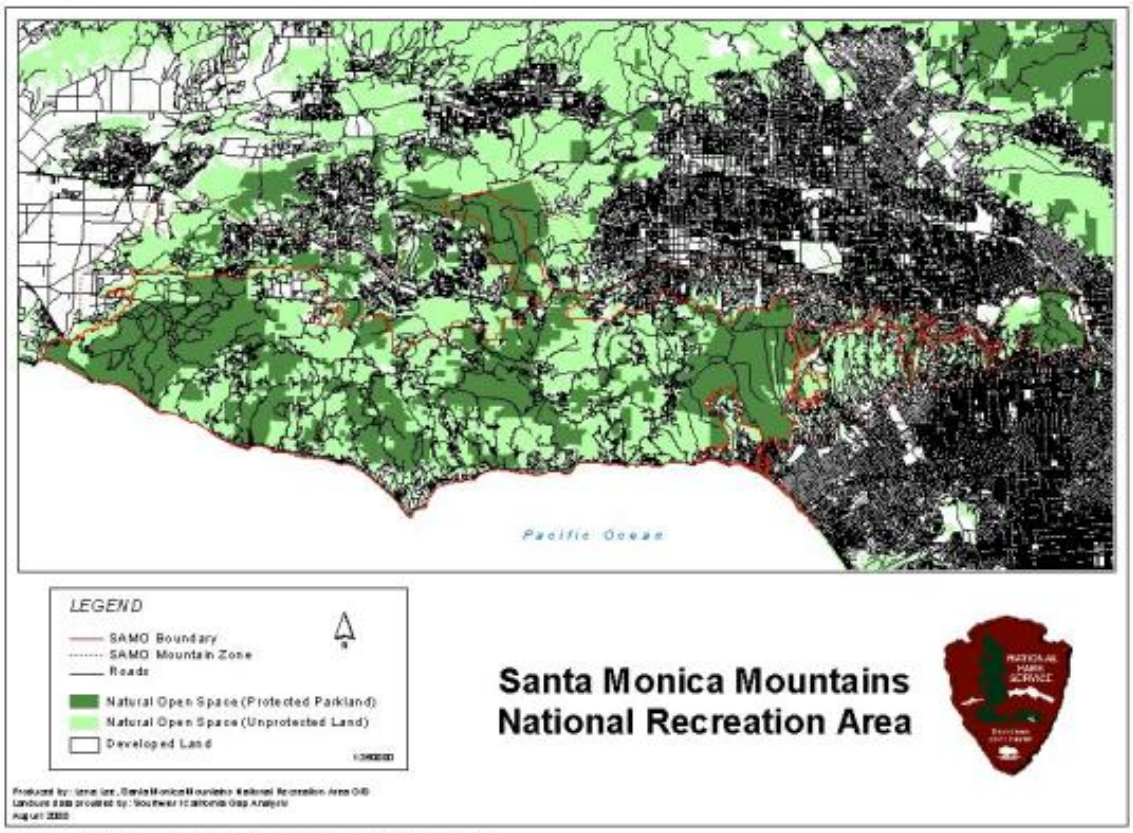

Figure 4. Map of Santa Monica Mountains National Recreation Area.

The Santa Monica Mountains are one of the last remaining examples of a relatively undisturbed Mediterranean-type ecosystem in the world. A unique climate, diverse topography, and other factors create a complex assemblage of vegetation types including oak woodland, several types of chaparral, coastal sage scrub, valley oak savanna, grassland, riparian woodland, wetland, and coastal marsh. This vegetation diversity provides abundant habitat for animal species, including 50 species of mammals, close to 400 bird species, and over 35 reptile and amphibian species. These natural resources occur within and adjacent to Los Angeles, the second largest urban area in the nation.

Worldwide, Mediterranean-type ecosystems are very rare, occurring on three percent of the earth's land area. Only 18 percent of this ecosystem type remains undisturbed. The Mediterranean-type ecosystem of southern California has been identified as one of the world's "hot spots" for biodiversity, an area of relatively small size with tremendous biological richness. Within the National Park System, SAMO represents one of the largest and most significant areas of protected Mediterranean-type ecosystem.

Although 90 percent of the park contains natural habitat, more than half of these areas are privately owned. The greatest threats to the natural resources within the park are impacts associated with transformation from natural open space to developed areas. In many other parks and reserves, legislated boundaries are complete or near completion and both external and internal development threats are less severe.

One of the most important tasks for the park resources management program is to identify the most significant, undisturbed natural resources in the Santa Monica Mountains. Information on the status and distribution of park resources is a critical pre-requisite for ensuring their protection. Additionally, a

thorough biological inventory is necessary to manage park resources in the face of the impacts from development and the increasing human population and activity in the mountains. Alien plant invasion, hydrologic alterations, poor land management practices, vegetation type conversion and loss of habitat resulting from increased fire frequency, impacts from visitor use, and impacts from residential development (e.g. light pollution, increased traffic, etc.) combine to make preservation of natural resources in this area more difficult than in most other comparable natural areas.

Existing biological inventories of the Santa Monica Mountains range from preliminary species lists to data records of opportunistic species sightings. A fairly complete flora of the Santa Monica Mountains has been published. However, distribution and abundance information in this flora is vague and not geo-referenced. The park has developed a list of sensitive plant species, compiled existing information into digital format and has begun to locate and assess reported locations. Additionally, potential distribution maps for two federally and state endangered taxa (*Dudleya cymosa, Pentachaeta lyonii*) have been developed through a cooperative project with researchers at University of California, Santa Barbara (UCSB). Minimal efforts have been made to inventory exotic plant species and native plant communities, and current information is extremely limited. Vertebrate inventories are poorly developed. A preliminary list of mammals exists, however no attempt has been made to confirm presence/absence, determine distribution, or measure abundance of the mammal species on this list. The park has more developed lists of herpetofauna and bird species, but very little or no information exists on distribution or abundance of the species on these lists.

Inventory objectives for SAMO include determining (or confirming) general distribution and abundance categories for all vascular plant and vertebrate species. A more detailed inventory is needed for species of special management interest, such as invasive exotic plants and animals, threatened and endangered species, raptors and herpetofauna.

I.C. Methods and Summary of Process

This document serves as the Mediterranean Coast Network's (MCN) study plan and describes the methods used to develop the plan. In February, 2000, the MCN wrote a pre-proposal to set the stage for development of the full study plan. This pre-proposal identified tasks, funding and staffing needs to develop the study plan. In March, 2000, MCN contracted with the United States Geological Survey, Biological Resources Division (USGS-BRD) to conduct a portion of the work identified in the pre-proposal.

Monthly meetings were held between NPS and USGS-BRD staff to direct development of the workshop and study plan. The project was divided into seven phases to be completed between March and September, 2000. This strategy includes the following timeline and milestones:

General strategy

Phase I: Review and assess existing inventories
Phase II: Organize and conduct workshop(s)
Phase III: Identify specific inventory goals for each park
Phase IV: Identify gaps in existing information
Phase V: Develop study plan to fill gaps
Phase VI: Review, revise, and finalize study plan
Phase VII: Identify potential cooperators, develop agreements

Table 2. Timeline for developing the Mediterranean Coast Network Biological Inventory Study Plan.

	Timeline						
Phase	**March**	**April**	**May**	**June**	**July**	**August**	**September**
I. Assessment	XXXXX	XXXXX	XXXXX				
II. Workshop			XXXXX	XXX			
III. Goal ID				XXXXX	XXXXX		
IV. Gap ID					XXXXX		
V. Develop plan						XXXXX	
VI. Review and finalize							XXXXX

Major milestones included the following:

- Complete assessment of existing inventories by May 30, 2000
- Hold workshop(s) on June 14 and 15, 2000
- Identify park goals by June 30, 2000
- Identify data gaps by July 30, 2000
- Complete and distribute study plan by August 30, 2000
- Review study plan by September 15, 2000
- Revise and finalize study plan by September 30, 2000

The first step in developing the study plan was to convene a group of experts in a scientific workshop to discuss the status of current knowledge and methods for additional data collection. Participants were chosen for their expertise in taxonomy and/or study design. Participants represented various institutions including academia, natural history museums, and natural resource management agencies (e.g. NPS, California Department of Fish and Game, etc.). See Appendix D for a full list of participants. The objectives of the workshop were to:

1. Review and correct existing inventories of vascular plants and vertebrates in Cabrillo National Monument, Channel Islands National Park, and Santa Monica Mountains National Recreation Area,
2. Identify inadequacies of existing inventories (gaps), and
3. Define how future inventories should be conducted to complete and maintain scientific records of

park resources.

Participants were given the existing NPS inventories of vascular plants and vertebrates for the three parks in the MCN. At the workshop, they were asked to review these data for completeness and accuracy with other experts. Participants discussed deficiencies in these inventories and survey designs needed to complete the inventories. The results of their work were used to develop this study plan.

II. EXISTING INVENTORIES

II.A. Methods

One of the objectives of the National Park Service Inventory and Monitoring Program is to document, through existing, verifiable data and targeted field investigations, the occurrence of at least 90 percent of the species of vertebrates and vascular plants currently estimated to occur in the park. Therefore, the initial phase of this study plan consisted of reviewing all known data and data sources to (1) establish a clear understanding of what is known in each of the parks and (2) determine whether the 90 percent standard had been reached in each park.

The NPSpecies database was created by the NPS to document the occurrence of vertebrates and vascular plants in national park units with significant natural resources. The master copy of the NPSpecies database will be a internet-based Oracle database with different levels of access for different individuals. NPSpecies uses standardized nomenclature and taxonomy from the Integrated Taxonomic Information System (ITIS) to ensure consistency and compatibility nationwide and to allow for changes in taxonomy. This database was distributed to all parks within the NPS system in March, 2000. As part of the initial inventory effort, each park began populating the database with existing information culled from herbaria, museum records, and voucher specimens.

In spring of 2000, technicians reviewed museum records, reports, voucher specimens, and natural history guides (e.g. flora) to conduct the initial inventory. They also interviewed experts, including scientists currently involved in data collection at the parks, to ensure that their information was as current as possible. This information was also reviewed during the workshop and annotated. The results of this review were then entered into NPSpecies with references and other supporting information, such as source, location, and date of collection.

The Dataset Catalog is another tool provided by the NPS to assist parks in their inventories by documenting existing data in the parks. The MCN originally proposed to use the Dataset Catalog to assist in developing the study plan, however, only an outdated version was available during the study plan preparation period. The NPS and USGS-BRD was advised by the I&M staff in Fort Collins to delay completing this portion of the study plan until an updated version of the Dataset Catalog was available. In the interim, technicians have begun compiling and will continue to compile information in hard-copy or other database formats. This information will be entered later into the Dataset Catalog

when an updated version becomes available.

II.B. Results

Populating the NPSpecies database is expected to be an ongoing task as new specimens and data sources are found. However, the MCN has completed this effort in the short term. Results of this effort are presented as reports generated by NPSpecies in Appendix A. This information is available electronically at each of the parks in an expanded form, but is truncated here for brevity's sake. Additionally, to determine whether the MCN had achieved the 90 percent species-documentation standard, we compared the number of species recorded or suspected in each park to the actual number of species confirmed. The results of this analysis can be seen in Table 3.

Table 3. Number and percent of vascular plants and vertebrate species confirmed or thought to be present in the Mediterranean Coast Network parks.

		NUMBER		PERCENT
TAXON	PARK	RECORDED[a]	CONFIRMED	CONFIRMED/RECORDED
PLANTS[1]	CABR	283	0	0
	CHIS	899	677	75
	SAMO	1007	893	89
MAMMALS[2]	CABR	30	2	7
	CHIS	50	22	44
	SAMO	54	39	72
BIRDS[3]	CABR	361	341	94
	CHIS	362	318	88
	SAMO	393	381	97
REPTILES AND AMPHIBIANS[2]	CABR	21	11	52
	CHIS	14	7	50
	SAMO	38	36	95
FISH[2]	CABR	146	11	8
	CHIS	189	15	8
	SAMO	26	16	62

[a] Recorded species derived from existing checklists, published references, museum vouchers, and other various databases and collections.

[1] Confirmed plant records from published floras.

[2] Confirmed mammal, reptile and amphibian, and fish records from published references and museum vouchers.

[3] Confirmed bird records from park checklists verified by local ornithologists and/or museum vouchers.

The other portion of this inventory effort included reviewing additional sources including geographic information systems (GIS) databases and peer-reviewed literature. A summary of GIS coverages is presented in Table 4 with a complete description of all coverages for each park in Appendix B. A current, comprehensive bibliography is presented in Appendix C.

Table 4. Summary of GIS coverages by general theme at all parks in the Mediterranean Coast Network.

GIS Layer	CABR	CHIS	SAMO
Boundary	X	X	X
Topography	X	X	X
Hydrology	X	X	X
Hypsography	X	X	X
Elevation	X	X	X
Vegetation Map		Partial	X
Soils	X		X
Trails		X	X
Roads	X	X	X
Structures	X	X	
DOQQs		X	X
DRG	X	X	X
Herpetofauna Distribution			
Mammal Distribution			
Fire History			X
Prescribed Burns			X
Threatened and Endangered Species	X	Partial	Partial
Sensitive Plants	X	To 1998	Partial
Sensitive Animals	Partial		Partial
Weedy Species	Partial	X	
Monitoring Sites	Partial	X	X
Research Study Sites	X	X	
Geology		Partial	X

At the workshop, experts reviewed these initial inventory efforts to determine their accuracy and completeness. Discussions generally resulted in the group recommending further study, either to refine residency or abundance information or to address questions of synonymy. Most groups felt that additional data mining was necessary to improve the lists. Most of these recommendations are captured

in the following section which describes additional inventories needed to meet the "90 percent species-documentation" criterion.

III. PROJECT DESCRIPTIONS

III.A. Overview of sampling strategies and recommended methods

Prior to the workshop, staff from USGS-BRD and NPS met to develop specific inventory objectives for taxa in each park. At the workshop, scientists reviewed park objectives and preliminary data, then identified various projects that were divided into two categories: (1) reviewing existing information and (2) collecting new information through additional field surveys. Generally, the tasks associated with the first category will improve species lists, primarily presence/absence data. Tasks associated with the second category generally address inventory objectives.

Following is a summary of the recommendations made by the experts at the workshop. Projects are divided by taxonomic group. Each project description contains an inventory objective, recommended sampling scheme, expert contacts to assist with study design and implementation, and an estimated cost.

The network recognizes that the total cost to fund this entire program exceeds the amount that has been allocated by the Inventory and Monitoring program. Table 5 provides an overview of the projects and their total estimated costs as well as the amount that is requested specifically from the Inventory and Monitoring program. Projects were prioritized with higher priority projects scheduled for early in the inventory. Zero or reduced funding was requested for the lowest priority projects. By postponing these unfunded lower priority projects until FY2003 and FY2004, the network has the opportunity to seek outside funding to fully implement all components of the inventory. Additionally, if other funds can be obtained for earlier projects, Inventory and Monitoring program dollars may be shifted to currently unfunded projects. The network is confident that other sources of inventory support may be available, particularly when Inventory and Monitoring funds are used to leverage other sources such as cooperating association grants, university-based funding, foundation grants, and park-based support.

Table 5. Summary of biological inventory projects and funding requested for the Mediterranean Coast Network parks.

Taxonomic Group	Number of Projects	Amount Required	Amount Requested
Plants	5	$ 337,434	$ 269,986
Mammals	3	$ 144,000	$ 75,000
Birds	4	$ 98,175	$ 53,175
Reptiles and Amphibians	1	$ 91,871	$ 91,871

Fish	4	$ 175,675	$ 47,675
Program Coordinator	–	*$119,478*	*$ 99,598*
Total (all projects)	**17**	**$ 966,633**	**$ 637,305**

III.B. Plants

Project III.B.1: ***Review and compile existing information (all parks).***

Fiscal Year(s) of Implementation: 2001

Inventory Objectives and Rationale: The first step in inventorying vascular plants is to use existing information to improve knowledge of presence, distribution, and abundance estimates of all plant species for all three parks. During the first stage of this inventory, much existing information was gathered and entered into the NPSpecies database. Workshop participants assessed this information and identified problems and information gaps and, where possible, existing sources to fill those gaps. These information gaps and information sources vary for each park.

Cabrillo National Monument (CABR) has no evidenced plant records listed in the NPSpecies database. However, voucher specimens reside at San Diego State University (SDSU), Santa Barbara Botanic Garden (SBBG) and the San Diego Natural History Museum (SDNHM). These voucher specimens need to be accessed and all of their information transferred into the NPSpecies database.

Channel Islands National Park (CHIS) has a majority of its plant records evidenced. However, a subset of species (approximately 150-200 plant species) need to be searched for at the SBBG, Rancho Santa Ana Botanic Garden (RSABG), and University of California, Los Angeles (UCLA). Also there are additional records for CHIS (helicopter survey, Wallace database) that need to be entered into the NPSpecies database as well as other park databases.

There is a published flora (now out of print) for the Santa Monica Mountains and voucher specimens reside at the UCLA herbarium. This flora serves as the primary source for the Santa Monica Mountains National Recreation Area (SAMO) NPSpecies database. However, the flora evolved and was published as a "working" document. Information was not always systematically compiled and the completeness of the voucher collection is not known. Since publication in 1986, over 60 new species additions and 40 otherwise noteworthy collections have been reported. A number of collections remain unresolved as to species identity. The reported new species have been added to the NPSpecies database, however, published or formally vouchered evidence does not exist for these records. In addition, SAMO extends into the Simi Hills, north of the Santa Monica Mountains and this area was not included in the published flora. Some additional species found in the Simi Hills have been added to the NPSpecies database based on information gathered at the inventory workshop, but no published or vouchered evidence exists for these records. Local experts should be consulted to determine additional species which may be present in the Simi Hills. Systematic compilation of this existing expert knowledge will

likely also result in (1) identification of specimens to be processed (see *Project III.B.2*) and (2) need for a limited amount of field survey to collect under-represented voucher specimens and assess completeness of resulting inventory.

Abundance and distribution information is needed for all three parks. At CHIS and CABR, analysis of existing monitoring data will provide abundance estimates for most species. Consultation with field experts will fill in information for remaining species. At SAMO, the abundance and distribution information contained in the existing flora (published in 1986) is inconsistent, out of date and incomplete. Again, local experts will be able to provide current information on abundance categories and general distribution for most species – both for the Santa Monica Mountains and the Simi Hills.

Completing the data gathering and compilation summarized above will fill in many of the identified knowledge gaps in a cost-effective manner and efficiently guide future field work where existing knowledge is not sufficient to meet overall network objectives.

Methods: This project is divided into four sub-projects to be undertaken concurrently: a) *Herbaria searches*, b) *Data conversion for incomplete CHIS databases*, c) *Analyze monitoring data for CABR*, and d) *Verify and expand plant species information for the Santa Monica Mountains and Simi Hills through a cooperative agreement*. Details of the methods for this project are described below. Cost estimates are included below the descriptions for each of the four sub-projects. Details of these cost estimates may be found in Table 11.

a) *Herbaria searches*. Improve species presence information for CHIS and CABR by conducting collaborative searches at various herbaria. For CABR, herbaria searches for all species will be conducted at SDSU, SDNHM, and SBBG. For CHIS, herbaria searches for a specific list of approximately 150-200 species will be conducted at SBBG, RSAGB, and UCLA. The CHIS list of species will focus on those found on Anacapa, San Miguel, and Santa Rosa Islands that are not listed in the Santa Cruz Island Flora or the Santa Barbara Island Flora. Results from the initial herbaria searches will determine whether additional herbaria should be searched. Other possible herbaria include Jepson Herbarium, and herbaria at California State University, Northridge (CSUN), University of California, Berkeley, and Stanford University. In addition, other data sources such as CalFlora and individual researchers and local experts who have conducted studies in a park or have knowledge regarding a park's flora will be consulted. All information and voucher records obtained through the herbaria searches and consultation will be entered into park databases and NPSpecies.

For SAMO, herbaria searches will be conducted at UCLA and RSAGB as part of sub-project *(d) Verify and expand plant species information for the Santa Monica Mountains and Simi Hills through a cooperative agreement*, described below. However, searches at the SBBG and other herbaria which are expected to contain only a limited number of Santa Monica Mountains specimens will be conducted by the technician or contractor searching these herbaria for CHIS and CABR.

For this portion of this project, the work for all three parks will be completed by hiring a GS-7 Biological Technician (plants) for approximately five months or by contracting the project.

Expert Contacts: Steve Junak, SBBG; Kathryn McEachern, USGS-BRD; Adrienne Russell, Mike Simpson, SDSU; Mitch Beauchamp, Pacific Southwest Biological Services

Estimated Time to Complete: 5 months
Estimated Cost: $ 25,497

b) *Data conversion for incomplete CHIS databases*. Additional species presence information for CHIS will be obtained by converting existing databases into a usable form. Helicopter surveys of Santa Rosa Island were conducted in 1998. The data has been partially entered into GIS but additional work needs to be done. This project will include entering additional tabular data into Microsoft Access, then transferring polygons to maps and digitizing them into the park's GIS. This portion of the project will also include conversion of the existing CHIS flora (Gary Wallace, 1980) into computerized database.

The network will hire a GS-5 level Biological Technician to work for three months to complete these tasks. Supervision and project management will be provided by park staff and by Gary Wallace.

Expert Contacts: Steve Junak, SBBG; Kathryn McEachern, USGS-BRD; Adrienne Russell, Mike Simpson, SDSU; Mitch Beauchamp, Pacific Southwest Biological Services; Gary Wallace

Estimated Time to Complete: 3 months
Estimated Cost: $ 7,275

c) *Analyze monitoring data for CABR*. Vegetation community monitoring data collected at CABR will be analyzed to obtain abundance estimates and correlate with or translate to NPSpecies abundance categories. Field experts will be consulted to assess analysis results and determine abundance for species not captured in monitoring program. The analysis work will be conducted by USGS-BRD Ecologist Kathryn McEachern as part of her normal workload. A GS-7 level Biological Technician would be hired to assist with data management and the fitting off the statistical results to NPSpecies abundance categories. This portion of the project should be completed within one month.

Expert Contact: Kathryn McEachern, USGS-BRD

Estimated Time to Complete: 1 month
Estimated Cost: $ 5,562

d) *Verify and expand plant species information for the Santa Monica Mountains and Simi Hills through a cooperative agreement*. For SAMO, species information in the current flora needs to be verified, updated and expanded to include the Simi Hills region. Presence/absence, abundance and distribution data need to be improved.

Through expert knowledge and consultation with local botanists, a cooperator will research, obtain, and compile critical information on (1) new species occurrences in the Santa Monica Mountains, (2) species presence in the Simi Hills, an area not covered by the Santa Monica Mountains flora, and (3) revised and updated abundance and distribution information for all species for SAMO. During the course of

this work, an inventory and evaluation of voucher specimens in the UCLA herbarium will be made. The RSABG herbarium will be also be searched for additional vouchers. Searches at the SBBG and other herbaria which are expected to contain only a limited number of Santa Monica Mountains specimens and will be conducted by the technician or contractor searching these herbaria for CHIS and CABR (see sub-project *(a) Herbaria searches*). The voucher inventory will focus on uncommon and rare taxa as determined by consultation with expert consultants. Collection and processing of unvouchered specimens will be performed as described in *Project III.B.2*, *Project III.B.3* and *Project III.B.4*. Species requiring field surveys will be identified and surveys will be conducted in out years as described in *Project III.B.3*, *Project III.B.4* and *Project III.B.5*. Survey work outside the scope of these projects will be performed by SAMO staff, interns and volunteers.

It was agreed by all SAMO consultants at the inventory workshop that the most efficient and reliable way to compile the information necessary to complete this project is through a cooperation with UCLA.

Expert Contacts: Barry Prigge, Phil Rundel, Arthur Gibson, UCLA; Carl Wishner, Envicom Corporation; Rick Burgess, California Native Plant Society; David Hollombe; Suzanne Goode, CDPR; Chester King; Mary Meyer, CDFG; Rick Riefner; Tim Thomas, USFWS

Estimated Time to Complete: 12 months
Estimated Cost: $ 38,875

Project III.B.1 Total Estimated Time to Complete: 12 months
Project III.B.1 Total Estimated Cost: $ 77,209
Project III.B.1 Total Requested Funds: $ 77,209

Project III.B.2: **Identify, collect and process voucher specimens (all parks).**

Fiscal Year(s) of Implementation: 2001, 2002, 2003

Inventory Objectives and Rationale: All three parks currently house or have access to unprocessed plant specimens. Until these specimens are processed, they do not contribute any information to the knowledge base concerning the plant species present within each of the parks. Processing these plant specimens will greatly improve the database with respect to the presence, distribution, and abundance estimates of all plant species within each park. For CHIS, there are approximately 125 new or noteworthy specimens collected from Santa Rosa Island in 1998. Most of these records reside at the SBBG and need to be accessed and processed. Specimens also reside at the SBBG for CABR; these records will also need to be accessed and processed. For SAMO, the Simi Hills have never been formally surveyed. We expect that during *Project III.B.1*, experts will identify specific areas to be surveyed for additional species. For all three parks, further voucher specimens will need to be collected and processed for known and under-represented species, as well as for any new species found.

***Methods*:** Finish processing existing dried specimens and collect additional voucher specimens for

under-represented species at all three parks. Three phases of work will be involved to complete this project. This work will be done by a contracted GS-7 level botanist.

Phase 1: Access and process existing specimens. Approximately 50 specimens reside at CHIS, with an additional 75 at SBBG. CABR has approximately 60 specimens at SBBG that need to be processed. Park staff estimate that SAMO will require processing of about 100 specimens.

Phase 2: Identify species that need additional voucher collections. The inclusion of voucher specimens acquired during Phase 1, coupled with the results of herbaria searches and consultation with local experts initiated under *Project III.B.1,* will help to identify additional specimens that need to be collected and processed. Additionally, these results will likely identify areas (i.e. the Simi Hills) that need to be surveyed.

Phase 3: Collect and process specimens of species identified during Phase 2. Specimen collection will be done in conjunction with *Projects III.B.3* and *Project III.B.4* at all three parks. Additionally, under-represented specimens at CABR will be collected during wandering surveys, particularly those in selected habitats, and conducted as part of *Projects III.B.3* and *Project III.B.4* to document species occurrences. Digital photos of each species in question will be taken.

Expert Contacts: Steve Junak, SBBG; Carl Wishner, Envicom Corporation; Tim Thomas, USFWS; David Hollombe; Rick Burgess, California Native Plant Society; Kevin Cummins, UCSB; Adrienne Russell, Mike Simpson, SDSU

CABR and CHIS
Estimated Time to Complete: 3 years (2-3 months per year*)*
***Estimated Cost*:** $ 13,800

SAMO
Estimated Time to Complete: 3 years (1-2 months per year)
***Estimated Cost*:** $ 8,325

Project III.B.2 Total Estimated Time to Complete: 3 years
Project III.B.2 Total Estimated Cost: $ 22,125
- **Total Cost FY2001: $ 12,187**
- **Total Cost FY2002: $ 4,969**
- **Total Cost FY2003: $ 4,969**

Project III.B.2 Total Requested Funds: $ 22,125

Project III.B.3: **Threatened, endangered and sensitive species surveys (all parks).**

Fiscal Year(s) of Implementation: 2002, 2003, 2004

Inventory Objectives and Rationale*:* Each of the parks has a sizeable number of federally listed plant

species and sensitive plant species. CHIS has 14 federally listed plant taxa and 120 sensitive plant species. Of these, the highest priority species are listed in Table 6. CABR has one federally listed plant and 25 plant taxa on its sensitive plant list. All of these species require additional study. SAMO has seven federally listed plant species and 29 sensitive plant taxa. Of these, six listed plants and 13 sensitive plants need further study. Table 6 summarizes these species for all three parks. While some of these species have been monitored and abundance information is available on them, others lack critical basic information such as distribution, abundance and threats. Field work will focus on those federally listed taxa for which little is known and/or that are annuals, due to their variable nature and response to wide ranging Mediterranean rainfall patterns. Other species will be prioritized based on amount of available information, relative rarity, and known threats. Completing this project will greatly improve the knowledge of distribution and absolute abundance of federally listed plant species and the relative abundance of sensitive species at all three parks.

Methods: The following methods were recommended for this project:

1) Study historic records, search gray literature (e.g. EIRs, agency reports, etc.) and consult experts on current and historic locations.

2) Survey known sites and potential habitat to establish distribution.

3) If the population is small, count individuals to obtain absolute abundance or if population is large, devise sampling plan, i.e., stratify and sample population to obtain relative abundance.

4) Document technique.

5) For annuals, census for at least three seasons to determine inherent population variability.

6) Update NPSpecies database and document all acquired data to federal standards.

7) Although survey methods can vary, sampling at CABR should consist of wandering search method, especially in certain habitats. This type of survey is feasible due to the small size of CABR.

8) Collect specimens, if possible, to add to voucher collections at all parks.

Additionally for CHIS, listed and sensitive plant surveys on Santa Cruz Island should be combined and conducted in conjunction with the invasive species surveys described in *Project III.B.4.* Rugged topography of Santa Cruz Island, coupled with lack of roads in large areas, necessitates use of helicopters and boats for efficiently and safely surveying remote areas. These tools, as well as jeeps/vehicles and hiking, will aid in surveying for weedy and rare species on Santa Cruz Island. Limited rare species surveys will be conducted on other islands and will be combined with invasive species mapping efforts, if feasible. CABR surveys can also be combined and performed at the same time. Voucher specimens will be collected for under-represented species. This will be the most efficient use of funds, time and personnel, resulting in up to 50 percent cost savings over included cost estimates for both of these parks.

Table 6. Endangered, threatened and sensitive plant species at all three parks identified for inventory surveys.

CABR Federally listed and other sensitive plant species.

Species	Common Name	State	Federal	CNPS
Chorizanthe orcuttiana	Orcutt's spineflower	E	E	1A
Aphanisma blitoides	Aphanisma	-	(C2)	1B
Agave shawii	Shaw's agave	-	-	2
Bergerocactus emoryi	Golden-spined cereus	-	-	2
Calindrina maritima	Sea kisses	-	-	4
Camissonia lewisii	Lewis's evening primrose	-	-	-
Chorizanthe fimbriata var. *fimbriata*	Fringed spineflower	-	-	4
Chorizanthe procumbern var. *procumbens*	Pala spineflower	-	-	P-4
Coreopsis maritima	Sea dahlia	-	-	2
Corethrogyne filaginifolia var. *incana*	San Diego sand aster	-	-	4
Ceanothus verrecosus	Wart-stemmed ceanothus	-	(C2)	2
Dichondra occidentalis	Western ponyfoot	-	(C3c)	4
Erysimum ammophilum	Coast wallflower	-	(C2)	4
Euphorbia misera	Cliff spurge	-	-	2
Ferocactus viridescens	San Diego barrel cactus	-	(C2)	2
Fritillaria biflora	Chocolate lily	-	-	P-4
Jepsonia parryi	Coast jepsonia	-	-	P-4
Lotus nuttallianus	Nuttall's lotus	-	(C2)	2
Microseris douglasii ssp. *platycarppha*	Small-flowered microseris	-	-	P-1B
Nemacaulis denudata var. *denudata*	Coast wooly-heads	-	-	P-2
Orobanche parishii ssp. *brachyloba*	Short-lobed broomrape	-	(C2)	1B
Opuntia parryi var. *serpentina*	Snake cholla	-	(C2)	1B
Piperia cooperi	Cooper's rein orchid	-	-	-
Quercus dumosa	Coastal scrub oak	-	(C2)	P-1B
Selaginella cinerascens	Ashy spike-moss	-	-	4
Vigueria lacinata	San Diego sunflower	-	-	2

CHIS Federally listed and other sensitive plant species.

Species	Common Name	State	Federal	CNPS
Arabis hoffmannii	Hoffmann's rock cress	E	E	1B
Arctostaphylos confertiflora	Santa Rosa Island Manzanita	-	E	1B
Berberis pinnata ssp. *insularis*	Island barberry	E	E	1B
Castilleja mollis	Soft-leaved paintbrush	-	E	1B
Dudleya nesiotica	Santa Cruz Island live-forever	R	T	1B
Galium buxifolium	Sea-cliff bedstraw	R	E	1B
Gilia tenuiflora ssp. *hoffmannii*	Hoffmann's slender-flowered gilia	T	E	1B
Helianthemum greenei	Island rush-rose	-	E	1B
Malacothamnus fasciculatus var. *nesioticus*	Santa Cruz island bush mallow	E	E	1B
Malacothrix indecora	Santa Cruz Island chicory	-	E	1B
Malacothrix squalida	Island chicory	-	E	1B
Phacelia insularis var. *insularis*	Northern islands phacelia	-	E	1B
Thysanocarpus conchuliferus	Santa Cruz Island lacepod	-	E	1B
Aphanisma blitoides	Aphanisma	-	(C2)	1B
Arctostaphylos tomentosa ssp. *insulicola*	Island manzanita	-	-	4
Arctostaphylos tomentosa ssp. *subcordata*	Santa Cruz Island Manzanita	-	-	4
Arctostaphylos viridissima	Bright green manzanita	-	-	4
Atriplex coulteri	Coulter's saltbush	-	-	1B

Atriplex pacifica	South-coast saltbush	-	(C2)	1B
Atriplex seranana var. *davidsonii*	Davidson's bractscale	-	-	1B
Ceanothus arboreus var. *glaber*	Santa Rosa Island wild lilac	-	-	#
Dendromecon rigida ssp. *harfordii*	Island tree poppy	-	(C2)	4
Epipactis gigantea	Stream orchid	-	-	-
Galium californicum ssp. *miguelense*	San Miguel Island bedstraw	-	(C3)	4
Lilium humboldtii var. *ocellatum*	Ocellated Humboldt lily	-	(C2)	4
Malacothrix foliosa ssp. *crispifolia*	Anacapa chicory	-	-	4
Malacothrix foliosa ssp. *philbrickii*	Philbrick's chicory	-	-	4
Malacothrix junakii	Junak's chicory	-	-	-
Platystemon californicus var. ciliatus	Santa Barbara Island cream-cups	-	(C2)	1B
Ribes thacherianum	Santa Cruz Island gooseberry	-	(C2)	1B
Sanicula hoffmannii	Haffmann's snakeroot	-	(C3c)	4
Trifolium palmeri	Southern islands clover	-	-	4

SAMO Federally listed and other sensitive plant species.

Species	Common Name	State	Federal	CNPS
Pentachaeta lyonii[1]	Lyon's pentacheata	E	E	1B
Astragalus brauntonii[2]	Braunton's milk-vetch	-	E	1B
Dudleya cymosa ssp. *marcescens*[1]	Marcescent dudleya	R	T	1B
Dudleya cymosa ssp. *ovatifolia*[2]	Santa Monica Mountains dudleya	-	T	1B
Dudleya cymosa ssp. *ovatifolia* (*agourensis*)[1]		A form of *Dudleya cymosa* ssp. *ovatifolia*		
Dudleya abramsii ssp. *parva*[1]	Conejo dudleya	-	T	1B
Dudleya verityi[1]	Verity's dudleya	-	T	1B
Hemizonia minthornii[1]	Santa Susana tarplant	R	(C2)	1B
Calochortus plummerae	Plummer's mariposa lily	-	(C2)	1B
Delphinium parryi ssp. *blochmaniae*	dune larkspur	-	(C2)	1B
Dudleya blochmaniae ssp. *blochmaniae*	Blochman's dudleya	-	(C2)	1B
Dudleya multicaulis	many-stemmed dudleya	-	(C2)	1B
Lasthenia glabrata var. *coulteri*	Coulter's goldfields	-	(C2)	1B
Chorizanthe parryi var. *parryi*	Parry's Spineflower	-	(C2)	3
Nolina cismontana	California beargrass	-	(C2)	-
Baccharis malibuensis[1]	Malibu baccharis	-	-	-
Orcuttia californica		-	-	-
Chamaebatia australis	Southern mountain misery	-	-	4
Stanleya pinnata	prince's plume	-	-	-

[1] Endemic to the Santa Monica Mountains and Simi Hills area.

[2] Major occurrence in SMM-SH area, there are a few occurrences outside area.

Rarity Designations:

Federal – US Fish and Wildlife Service categories of threat and endangerment

E = Endangered

T = Threatened

(C2) = This category was recently eliminated by USFWS, but we have retained it here to indicate concern about the species' status.

(C3) (C3c) = These categories were recently eliminated by USFWS, but we have retained them here to indicate concern about the species' status.
SC = Species of Concern, not ranked under old USFWS system.

State – California
E = Endangered
T = Threatened
R = Rare
PE = Presumed Extinct
CE = Candidate Endangered

California Native Plant Society (CNPS)
1A = plants that are presumed extinct in California
1B = plants that are rare, threatened, or endangered in California and elsewhere
2 = plants that are rare, threatened, or endangered in California, but more common elsewhere
3 = plants about which we need more information—a review list
4 = plants of limited distribution—a watch list
# = considered but not designated—more common than previously realized

***Expert Contacts*:** Kathryn McEachern, USGS-BRD; Steve Junak, SBBG; Tim Thomas, USFWS; Adrienne Russell, Mike Simpson, SDSU; Carl Wishner, Envicom Corporation; Rick Burgess, California Native Plant Society; Suzanne Goode, CDPR

CABR
Estimated Time to Complete: 3 years (4-6 weeks per year)
***Estimated Cost*:** $ 10,900

CHIS
Estimated Time to Complete: 3 years (6-8 months per year)
Estimated Cost: $ 95,000

SAMO
Estimated Time to Complete: 3 years (6 months year 1, 4 months year 2 and 3)
Estimated Cost: $ 36,400

Project III.B.3 Total Estimated Time to Complete: 3 years
Project III.B.3 Total Estimated Cost: $ 142,300
Project III.B.3 Total Requested Funds: $ 105,852

Project III.B.4: **Invasive exotic species surveys (all parks).**

Fiscal Year(s) of Implementation: 2002, 2003, 2004

Inventory Objectives and Rationale: All three parks have known infestations of invasive exotic weeds. These invasive weeds pose a direct and indirect threat to some of the parks' listed plant taxa and to each of the park's native fauna. Within SAMO, approximately 20 non-native plant species are of

serious concern to the park managers. Of those 20, ten (Table 7) have been identified as the current highest priority ecological threat. This list is composed of species which are, as yet, not extensively established in the Santa Monica Mountains, but which have the potential for rapid spread and, further, are ecologically disruptive where they do occur. Thus, with immediate action, SAMO has an opportunity to control these species before they become established and irretrievably alter the ecosystem. Within CHIS, approximately 135 non-native plant species have been identified as serious ecological threats. Four of the five islands have been partially surveyed within CHIS but additional areas need to be investigated. CHIS is somewhat unique because it is composed of islands. Once the current infestations of invasive weeds are located and eradicated, the park has a better of keeping its lands non-infested. CABR is the smallest of the three parks with approximately 30 percent infested with invasive weeds. Approximately 84 invasive weed species have been identified as occurring within the park but the current distribution and abundance of these plant species needs further study. Completing this project will improve knowledge of distribution and absolute or relative abundance of invasive exotic species within all three parks.

Methods: Substantial local knowledge about the location of invasive exotic plant populations exists for all three parks. However, this knowledge should be compiled into an accessible database and a GIS layer of known distribution for these species. This project will aid all three parks in determining the need for future control or monitoring as part of each park's invasive exotic species control program.

At SAMO and CABR, for the highest priority invasive exotic species (see Table 7), potential habitat will be surveyed for additional occurrences. Known locations will also be visited to determine current status and obtain abundance information for high priority species. Additionally, as mentioned in *Project III.B.2*. and *Project III.B.3*, surveys done at CABR will be combined to include wandering surveys of rare and weedy species, as well as collection of voucher specimens for under-represented species. For SAMO, some of the information may be acquired during the riparian surveys (*Project III.B.5*) and costs for this project may be reduced.

For CHIS, the largest gap in weedy species knowledge is for Santa Cruz Island, and is therefore the highest priority. A weed survey is required for portions of Santa Cruz Island, prioritized by area, for all the species listed in Appendix F. Work is in progress to prioritize areas for these surveys. Rugged topography and lack of roads necessitates the use of helicopter and/or boat assistance to efficiently and safely access remote areas. The northwest and southwest quadrants of the island are most remote and will require helicopter and/or boat assistance. Existing information gathered by non-federal parties needs to be obtained prior to conducting these surveys. Steve Junak has done the most island-wide botanical surveys, and Jeff Howath and Lyndal Laughrin have significant knowledge on weed infestations as well. Field work will cost approximately $ 25,000 and data management by GS-7 Biological Technician will cost approximately $ 15,000.

The second priority for CHIS is to survey portions of San Miguel and Santa Rosa Islands for the same species not surveyed in the last four years. Approximately 25 percent of San Miguel Island and 15 percent of Santa Rosa Island require further surveys. Field work will cost approximately $ 7,000 and data management by GS-7 Biological Technician will cost approximately $ 3,000.

Table 7. Priority exotic plant species identified for intensive inventory effort for SAMO and CABR.

SAMO Species	**CALEPPC** Status
Ageratina adenophorum (eupatory)	B
Ailanthus altissima (tree-of-heaven)	A
Arundo donax (giant reed)	A
Centaurea solstitialis (yellow star thistle)	A
Cynara cardunculus (artichoke thistle)	A
Delairia odorata (Cape ivy)	A
Foeniculum vulgare (fennel)	A
Lepidium latifolium (peppergrass)	A
Phalaris aquatica (Harding grass)	B
Spartium junceum (Spanish broom)	B

CABR Species	**CALEPPC** Status
Carpobrotus edulis (ice plant, hottentot fig)	A
Centaurea melitensis (tecalote thistle)	B
Centaurea solstitialus (yellow star thistle)	A
Cortaderia atacamensis (pampas grass)	A
Foeniculum vulgare (fennel, flea bane, licorice)	A
Hypericum canariensis (Klamath weed)	Need more information
Mesembryanthemum crystallinum (crystalline iceplant)	B
Mesembryanthemum nodiflorum (small-flowered iceplant)	Need more information
Salsola iberica (Russian thistle)	Need more information

CalEPPC Categories:

List A = Documented as aggressive invaders that displace natives and disrupt natural habitats.
List B = Invasive pest plants that spread less rapidly and cause a lesser degree of habitat disruption.
Need More Information = Plants for which current information does not adequately describe nature of threat to wildlands, distribution of invasiveness. Further information is requested from knowledgeable observers.

Recommended methods for all parks are to:

1) Consult with local experts to compile existing knowledge and develop distribution maps for known occurrences,

2) Develop potential habitat maps,

3) Survey known sites as well as identified potential habitats,

4) Map distributions and gather general abundance data (abundance could be characterized by categories such as “few”, “moderate”, or “many” or numeric categories such as 1-10, 10-100, 100-1000, etc.)

5) Document technique, and

6) Update NPSpecies database and document to federal standards all resulting data.

Expert Contacts: Steve Junak, SBBG; Jeff Howath; Lyndal Laughrin, UC Reserve; Kathryn McEachern, USGS-BRD; Carl Wishner, Envicom Corporation; Adrienne Russell, Mike Simpson, SDSU; Suzanne Goode, CDPR; Phil Rundel, Arthur Gibson, UCLA; Tim Thomas, USFWS

CABR
Estimated Time to Complete: 4 weeks
Estimated Cost: $ 3,000

CHIS
Estimated Time to Complete*:* 3 years (shared effort with *Project III.B.3*)
Estimated Cost*:* Santa Cruz Island: $ 40,000
Other islands: $ 10,000

SAMO
Estimated Time to Complete*:* 8 months
Estimated Cost: $ 20,800 (Biological/GIS Technicians)

Project III.B.4 Total Estimated Time to Complete: CABR and SAMO – < 1 year
CHIS – 3 years
Project III.B.4 Total Estimated Cost: $ 73,800
Project III.B.4 Total Requested Funds: $ 64,800

Project III.B.5: **Riparian understory shrub and herbaceous plant species surveys at SAMO.**

Fiscal Year(s) of Implementation: 2003

Inventory Objectives and Rationale: Riparian communities and associated wetland habitats make up less than one percent of the land area in the Santa Monica Mountains, but are the primary habitat for nearly 20 percent (125 species) of the native vascular plant flora. Because of the unique ecotonal nature of riparian habitats, riparian species are affected not only by local and cumulative disturbance regimes along their channels, but also by changes in ecosystem processes resulting from disturbances in surrounding upland communities. In the Santa Monica Mountains, residential development, stream channel modification, altered fire regimes, and recreational use have had and will continue to have significant impacts on diversity and distribution of riparian plant species. These impacts result directly from physical changes in the environment and indirectly from the introduction of exotic species which displace natives. The purpose of this project is to provide a systematic inventory of the abundance and distribution of native and exotic riparian species. Native overstory (tree) species have already been mapped, so the focus of this inventory will be on understory species. A higher level of inventory than

for the full flora is necessary because of the sensitivity of riparian species to a broad range of ongoing local and regional disturbances. This inventory will provide a baseline for future monitoring of riparian species and provide information necessary to implement conservation efforts.

Methods: Riparian species distribution and abundance will be determined for a subset of streams and riparian habitat types following the selection criteria used for "rapid stream assessment" of amphibians. The Santa Monica Mountains has been divided into four ecologically distinct units (Simi Hills, Western, Central Coast, and Malibu Creek Watershed) within which a total of 30 streams have been selected as representative of the different riparian habitats within the mountains. For this inventory, the streams will be further divided into geomorphically and hydraulically distinct reaches. Reaches in turn will be divided into habitat units based on the age and composition of overstory vegetation. Relative abundance of species will be determined within habitat units.

Expert Contacts: Phil Rundel, UCLA; Wayne R. Ferren, UCSB

Project III.B.5 Total Estimated Time to Complete: 4 months
Project III.B.5 Total Estimated Cost: $ 22,000
Project III.B.5 Total Requested Funds: $ 0

III.C. Mammals

The mammal lists for each park were relatively small (in comparison to birds and plants) and were relatively easy to review at the workshop by the experts. After reviewing species lists for the three parks, experts felt that mammals are generally well known in terms of presence/absence, with the exception of bats. However, abundance categories are not well known for most taxa. Where possible or obvious, the workshop group assigned abundance categories. Generally, the group recommended field studies to study bats and a few other species as identified by the park-specific inventory objectives. These are identified in the following project statements:

Project III.C.1: **Bat surveys (all parks).**

Fiscal Year(s) of Implementation: 2002

Inventory Objectives and Rationale**:** To determine bat distributions at all parks in the Mediterranean Coast Network. Bats are critical to ecosystem function, (e.g. plant reproduction), however, very little is known about bat species in all three parks. Past bat surveys within the parks are generally sporadic and patchy, and no organized comprehensive survey has been conducted. The current species lists for SAMO is based only on distribution maps from field guides. Historic records need to be verified. Bat distribution and abundance needs to be determined within the land ownership mosaic at SAMO. At CHIS, bat foraging and roosting habitat has been significantly impacted by historic grazing and

vegetation change. Data are needed in order to assess population status and changes as islands recover from past grazing impacts. A fairly complete survey has been completed for Santa Cruz Island, but the other islands need more comprehensive surveys. At CABR, a recent (1994-1995) bat survey was completed but needs to be updated. Possible impacts to bats at CABR from military ultrasonic transmissions underscore the need for more complete bat surveys.

***Methods**:* Different combinations of standard bat monitoring techniques methods will be used at each park, due to unique needs and environmental conditions. Because sampling bias exists in all survey methods, a combination of acoustic monitoring, night and day roost surveys, and mist netting will be implemented in order to gain the most complete picture of the bat fauna at the three parks. The Anabat system of automatic acoustic detection will be used to remotely monitor locations as potential netting sites. However, since some bats (e.g. pallid bats) do not emit loud signals, mist netting will detect their presence better than acoustic sampling. Additionally, roost surveys will be conducted during the day, especially in areas with high levels of nocturnal acoustic activity. Bridges and buildings will be surveyed for presence of night roosts, and cliff faces, hollow trees, mines and caves will also be surveyed for roosts. Roost searches are the only reliable method used to detect certain species, such as Townsend's big-eared bat, a species in decline in California and documented on Santa Cruz Island. Bats will be captured in roosts with hand nets or with mist nets at emergence for positive species identification. Maternity colonies will not be entered. Surveys will be conducted at all seasons with the most effort during maternity season (April-August). Early spring and early fall surveys during Santa Ana conditions will detect migrants.

Expert Contacts: Patricia Brown, Robert Berry, Brown-Berry Consulting; Elizabeth Pierson, North American Bat Conservation Project; Karen Miner, CDPR; Drew Stokes, USGS-BRD; Diana Simons, Stephanie Remington; Paul Collins, SBMNH

***Estimated Time to Complete**:* 12 months
***Estimated Cost*:** CABR – $ 5,000
CHIS – $ 30,000
SAMO – $ 40,000

Project III.C.1 Total Estimated Time to Complete: 12 months
Project III.C.1 Total Estimated Cost: $ 75,000
Project III.C.1 Total Requested Funds: $ 75,000

Project III.C.2: **Small mammal surveys on CABR and SAMO.**

Fiscal Year(s) of Implementation: 2004

***Inventory Objectives and Rationale*:** To determine distribution and relative abundance for small mammals on SAMO and CABR, with particular attention to two federally sensitive species. Point Loma is also being evaluated by USFWS as a potential site for re-introduction of the federally

endangered Pacific little pocket mouse. A complete inventory of small mammals for Point Loma is needed to determine exactly which species reside here, and their relative abundance and distribution by habitat to track the population trends and use that information to predict or understand trends in their predators (e.g., large mammals, raptors, snakes).

***Methods*:** Review and compile existing information from museum records, universities, past studies, etc. Small mammals will be sampled via arrays of live traps deployed in different habitat types: coastal sage scrub, maritime succulent scrub, coastal bluff scrub, and southern maritime chaparral. Samples should be collected twice each year for at least one year. Surveying should be conducted in the spring and fall to bracket seasonal variation. Exact number of traps, array size and shape as well as the number of plots per habitat type will be determined in cooperation with experts. Voucher specimens should also be collected for all *Peromyscus* species found at CABR. Technicians could work under existing personnel at CHIS and SAMO.

Expert Contacts: Shanna Dodd, SDodd Biological; Steve Montgomery, SJM Biological Consulting; Robert Fisher, USGS-BRD

Project III.C.2 Total Estimated Time to Complete: 12 months
Project III.C.2 Total Estimated Cost: $ 44,000
Project III.C.2 Total Requested Funds: $ 0

Project III.C.3: **Small mammal and endemic carnivore studies at CHIS.**

Fiscal Year(s) of Implementation: 2004

Inventory Objectives and Rationale: To determine distribution and absolute abundance for the Santa Cruz harvest mouse, island foxes, and Channel Islands spotted skunks. Island fox populations in the park have declined by 90 percent since 1994, due to golden eagle predation facilitated by an alien prey base (feral pigs) and historic conversion of shrub communities to annual grasslands. Populations of Channel Island spotted skunk have apparently increased while foxes have declined. Detailed inventory data are required to guide management of both these rare, endemic species.

Methods: For all species, review existing information and past studies. For the harvest mouse, continue live trapping at traplines established at sites on Santa Cruz Island (Prisoner's Bay, East Central Valley, Fraser Point, The Nature Conservancy grids, and the east end). Design should include approximately 100 traps per grid. Effort should include at least three night trappings per year. Use information from existing studies (e.g. Roemer, Crooks) to establish new grids for fox and spotted skunks and establish traplines if grids provide inadequate information for skunks. Also, observe and collect scat, tracks and aromatic surveys stratified by habitat. Habitats include: grass, coastal sage scrub, chaparral, riparian, woodland, and pine forests. Grids should include 60 traps per grid to be

sampled once per year. Traplines should include 10-30 traps per line and be sampled once per year in each habitat type. Track, scat, and aroma surveys should be conducted once per year in each habitat type.

Expert Contacts: Lyndal Laughrin, UC Reserve; Gary Roemer, UCLA; Kevin Crooks, University of Wisconsin, Madison; Dirk Van Vuren

Project III.C.3 Total Estimated Time to Complete: 12 months
Project III.C.3 Total Estimated Cost: $ 25,000
Project III.C.3 Total Requested Funds: $ 0

III.D. Birds

Generally, experts felt that species checklists for avifauna in the three parks were fairly complete at the presence/absence level. Group discussion revolved around residency and abundance categories associated with species on the checklists. The group clarified and corrected this information where needed. As a result, the abundance and residency designations on the species lists are the result of group knowledge and consensus, not quantitative data based on field surveys. The group felt that the best way to improve the species list information was to increase the level of species-specific documentation. This is addressed in *Project III.D.1: Document bird species checklists (all parks)*. To address other park-specific inventory objectives, several other projects were identified and are as follows:

Project III.D.1: **Document bird species checklists (all parks).**

Fiscal Year(s) of Implementation: 2001

Inventory Objectives and Rationale: To improve knowledge and documentation of the presence or absence of bird species in all three parks based on information provided in existing checklists. Generally, checklist information appears fairly accurate in terms of potential species occurrences. However, little or no information is provided on checklists regarding formal documentation of species in the parks. This project will address this problem by using the checklist information as a basis for compiling documentation for each species. By searching museum records, universities, and other institutions, and interviewing regional experts, presence/absence data for bird checklists will be documented and this information entered into NPSpecies.

Methods: For each park, bird species checklist information will be documented by assessing museum records, universities, and other institutions (e.g. Western Foundation of Vertebrate Zoology (WFVZ)). Regional experts will also be contacted for information on bird species presence/absence in each park. The goal of this effort will not be to add species, but rather to compile the documentation for those

already on the lists. Documentation will be based on published sighting records or other "formal" documentation (e.g. field notes maintained as part of museum records, species checklists based on field observations, Breeding Bird Atlas data, etc.). An attempt will be made to locate the most recent documented observation for each species and enter this information into NPSpecies. For rare and sensitive species, historic information and distribution will also be obtained and linked to *Project III.D.2* for sensitive bird species (see below). For all species, information on voucher specimens will be obtained and entered into NPSpecies. The ultimate products for this project will be up-to-date bird checklists for each park, with associated documentation for each species on the checklist.

To implement this project, the network could hire a technician, graduate student, or contract for the necessary services. An individual compiling data for this project would be required to visit local institutions, evaluate museum records, and interview ornithologists. Information on bird presence/absence would be entered into NPSpecies and park-specific databases. Distribution information for rare and sensitive species would be entered into an associated GIS database. It is expected that project could be completed over a four month period. As a top priority project necessary to meet minimum NPS inventory requirements, it is recommended that the work be implemented in fiscal year 2001.

***Expert Contacts**:* Larry Allen, L.A. Breeding Bird Atlas; Walter Wehtje, WFVZ; Walter Sakai, Santa Monica College; Dan Cooper, Audubon Society; Paul Collins, SBMNH; Hartmut Walter, UCLA; Kimball Garrett, LACMNH; Phil Unitt, SDMNH; Claude Edwards; Guy McCaskie.

Project III.D.1 Total Estimated Time to Complete: 4 months
Project III.D.1 Total Estimated Cost: $ 23,175
Project III.D.1 Total Requested Funds: $ 23,175

Project III.D.2: **Rare, sensitive, and island endemic bird species inventory (all parks).**

Fiscal Year(s) of Implementation: 2004

***Inventory Objectives and Rationale**:* To determine the distribution of rare and sensitive species in all three parks, and island endemic species at CHIS. Each of the parks contain a number of species listed as rare, threatened, or endangered. In addition, the parks have identified several "sensitive" species of special concern due to rarity and/or environmental threats. For CHIS, a number of island endemic species are of particular concern. For most of these species, only limited information is available regarding historic and recent distribution, and their current status in remaining habitats. This project will compile and assess existing data on these species, including presence/absence and distribution, and include field work for selected species to establish distribution and relative abundance.

Methods: For the above species, document distribution and status by reviewing historic records and conducting presence/absence surveys in potential habitats. All available recent and historic data on the

distribution of rare, sensitive, and island endemic bird species will be obtained from museum records and other data sources (e.g. universities, Breeding Bird Atlas data, WFVZ, etc.). This information will be compiled into NPSpecies and entered into a GIS database. For a subset of top priority species, habitats of high potential occurrence will be surveyed. Habitats will be identified based on known locations from recent/historic data and the current appropriateness of sites to support the species. Presence/absence surveys will be conducted using directed searches of appropriate habitats. Evidence of breeding will also be evaluated. To estimate relative abundance by habitat type, point counts will be used and stratified among appropriate vegetation types. Sampling effort will depend on species-specific considerations and habitat conditions (to be determined).

To implement this project, technician(s) will interview regional ornithological experts, compile data from museum records and other sources, enter these data into NPSpecies and park-specific databases, and develop a GIS layer of sensitive bird distribution from location information. These methods will be very similar to those used for the bird checklist documentation project (see *Project III.D.1*, above). For this project, all recent and historic data (including location data) will be compiled for each species rather than simply obtaining recent documentation of presence/absence.

Following the completion of the recent and historic distribution assessment, field surveys will be conducted in selected habitats by individual(s) familiar with the species of interest. The field effort will be limited to specific sites and species, and during appropriate seasons. Field work will be designed to confirm the presence of sensitive species in potential habitats, estimate relative abundance by habitat, and determine if breeding occurs. Species of interest will include only those birds consistently dependent on park resources (i.e. excluding vagrants) and species for which NPS management actions could assist in maintaining population persistence or recovery.

For CHIS, field surveys will include directed searches and point counts to estimate relative abundance of eleven island endemic species (list available from CHIS). Surveys similar to those designed for rare and sensitive birds will be used to establish the presence, distribution, and relative abundance of island endemics on each of the Channel Islands. Field surveys will be based on recent/historic data on island endemic bird distributions.

***Expert Contacts**:* Larry Allen, L.A. Breeding Bird Atlas; Walter Wehtje, WFVZ; Walter Sakai, Santa Monica College; Dan Cooper, Audubon Society; Paul Collins, SBMNH; Kimball Garrett, LACMNH; Phil Unitt, SDMNH; Claude Edwards

***Estimated Time to Complete**:* 12 months
Estimated Cost: CABR – $ 5,000
SAMO – $ 10,000
CHIS – $ 20,000
Funding Requested: $ 0

Project III.D.2 Total Estimated Time to Complete: 12 months
Project III.D.2 Total Estimated Cost: $ 35,000

Project III.D.2 Total Estimated Cost: $ 0

Project III.D.3: **Breeding raptor inventory (all parks).**

Fiscal Year(s) of Implementation: 2003

Inventory Objectives and Rationale: To determine the relative abundance of adult raptors and absolute abundance of raptor nest sites in all three parks. Raptors are regarded as ecologically important and potentially threatened in all three parks. For example, at CHIS, the bald eagle historically ranged on the islands and may have helped exclude golden eagles, a recently arrived predator of the sensitive island fox. In SAMO, raptor species diversity is especially rich, but ongoing urban development and human activities may threaten long-term persistence of some species. In CABR, raptors play an important role in this well-preserved "island" of southern California coastal sage scrub. For all three parks, very little information is available about raptor abundance and nesting distribution. To protect these species and to obtain baseline data for monitoring these species as potential vital sign indicators of ecosystem health, adult and nest surveys are required.

Methods: Adult raptors and raptor nest sites will be assessed using helicopter surveys in conjunction with directed field surveys. Helicopter surveys will be used to greatly reduce the field time needed to survey raptors and nests in highly inaccessible areas (e.g. cliff sides and rocky outcrops). Targeted survey areas will be identified using GIS vegetation data to evaluate habitat availability, helicopter field reconnaissance, and historic distribution information. As part of this project, historic data on breeding raptors will be assembled from museum records, egg collections, and other sources. For CHIS, existing information on island-specific raptor distribution will also be used to help establish survey locations.

Expert Contacts: Pete Bloom, WFVZ; Brian Latta; Paul Collins, SBMNH

Project III.D.3 Total Estimated Time to Complete: 12 months
Project III.D.3 Total Estimated Cost: $ 30,000
Project III.D.3 Total Estimated Cost: $ 30,000

Project III.D.4: **Migratory bird inventory (all parks).**

Fiscal Year(s) of Implementation: 2004

Inventory Objectives and Rationale: To determine abundance of migratory species in all three parks, mist net stations will be established. All three parks are regularly visited and utilized by numerous migratory species. In some cases, these species spend significant time in the parks and may depend on park resources for survival. Currently, very little is known about the habitat and temporal utilization of the three parks by migratory species. This project will provide this information. Although important,

this time and labor intensive project is the network's lowest priority bird inventory need.

Methods: Mist net stations will be established in all three parks. Stations will be established in varying habitats, geographically stratified across the parks. Stations will follow sampling designs similar to the Monitoring Avian Productivity and Survivorship (MAPS) protocol so that following inventory work, the sites can be readily converted into monitoring sites. Because mist netting may under-represent aerial foragers, nocturnal species and migrants present only in very low numbers or in very specialized habitats, this method should be augmented by some other field method (e.g. point counts). This would also facilitate sampling within the comparatively short migration window for many land-bird species.

Expert Contacts: Walter Sakai, Santa Monica College; Pete Bloom, Walter Wehtje, WFVZ; Paul Collins, SBMNH.

Project III.D.4 Total Estimated Time to Complete: 12 months
Project III.D.4 Total Estimated Cost: $ 10,000
Project III.D.4 Total Estimated Cost: $ 0

III.E. Reptiles and Amphibians

Experts convened at the workshop reviewed the species lists and added/deleted species based on personal knowledge and group consensus. They also reviewed the abundance categories and made changes according to personal experience with particular species. Several species were changed from common to uncommon and others were changed to unknown indicating a need for more information. The results of their discussion are reflected in the reptile and amphibian species list in Appendix A.4.

At all three parks, some information has been collected on reptiles and amphibians, however, additional inventory work is necessary. In addition, for SAMO and CABR, reptiles and amphibians have been identified as indicator species for future long-term monitoring. Thus, it is especially important to obtain baseline inventory data at these two parks. The recommended project below focuses on reptiles and terrestrial amphibians. These species are in most need of additional inventory work, particularly at SAMO and CABR. In SAMO, where there are substantial aquatic habitats and amphibian populations, stream surveys are already underway and will supplement the terrestrial species surveys. In CABR, freshwater aquatic habitats are limited and additional stream surveys are not required.

At CHIS, the detailed methods for sampling reptiles and amphibians will be determined in fiscal year 2002, following initiation of field work at SAMO and CABR. Because fewer reptiles and amphibians occur on the islands, ongoing monitoring has occurred for some species, and compliance issues may affect project implementation, alternatives to extensive pitfall trap arrays on CHIS will be evaluated in FY 2002.

Project III.E.1: **Survey reptiles and amphibians (all parks).**

Fiscal Year(s) of Implementation: 2001, 2002

Inventory Objectives and Rationale: To determine the distribution and status of reptile and terrestrial amphibian populations at all three parks, and conduct a comprehensive inventory for these species. The installation of pitfall trap arrays will be used to conduct the field sampling. In CABR, arrays have already been installed and funds will be used to continue the inventory effort at existing arrays. In SAMO, new arrays will be installed in FY2001 to complement arrays already installed by the park in FY2000. In CHIS, arrays (if necessary and feasible) will be installed in FY2002.

Methods: To sample terrestrial reptiles and amphibians, pitfall trap arrays will be installed in representative habitats throughout the parks. Sampling protocols will follow those developed by Robert Fisher of the USGS-BRD and already implemented throughout other areas of southern California. This type of pitfall trap sampling has been demonstrated to be an extremely comprehensive, accurate, and systematic method for sampling reptiles and amphibians in the region (Case and Fisher, 2000). Research has also indicated that the arrays are effective at sampling species that are nocturnal, fossorial, or cryptic (Case and Fisher, 2000).

Each pitfall trap array consists of seven five-gallon buckets used as pitfall traps, connected by shade cloth drift fences (15 meter arms), in the shape of a "Y". The drift fences help direct reptiles and amphibians into the buckets (the traps also allow sampling of some small mammal species and macroinvertebrates). Funnel traps are incorporated into the design to capture larger snakes that can typically escape the five-gallon pitfall traps.

Work to be conducted at SAMO

The Santa Monica Mountains have been divided into four sampling regions for the purpose of stratifying pitfall trapping sites across varying habitats and to include regions variously affected by human activities. In each sampling region, 20 arrays will be installed. The sampling regions are:

- Simi Hills – north of US-101 Freeway
- Western Region – including Point Mugu State Park and Circle X Ranch
- Central Coastal Region – including coastal habitats and hillsides which are not part of the Malibu Creek Watershed
- Malibu Creek Watershed – south of US-101 Freeway

The regions represent four ecological units, each with a distinct set of characteristics. The Simi Hills are separated from the rest of the Santa Monica Mountains by the 101 Freeway. Most of this region is privately owned and highly impacted by urban development and associated influences. The Western Region is primarily public land and is relatively undeveloped. This region is the most "pristine" among

the four sampling units. The Central Coastal Region includes a number of relatively small watersheds that drain into the ocean from the south-facing slope of the Santa Monica Mountains. Substantial amounts of coastal sage scrub and other coastal vegetation types make this sampling region unique. Finally, the Malibu Creek Watershed is unique in that it is the largest watershed in the mountain range and is the only watershed that cuts through the mountains. There are many impacts in the Malibu Creek Watershed including non-point source pollution, exotic species introductions, habitat destruction, and changes in hydrology.

The 20 arrays installed in each sampling region will be stratified across vegetation types to ensure complete sampling of habitats in each region. Specific site selection will be conducted in cooperation with USGS-BRD researchers, NPS biologists, and other cooperators. GIS data on vegetation and habitat distribution will be used to aid in site selection across the sampling areas.

Installation of arrays will occur in early FY2001. Actual sampling will be initiated soon after installation of individual arrays. USGS-BRD researchers will work with NPS biologists, interns, students, university researchers, and other agency cooperators to install and monitor the sites. Sites will be sampled for 10 days once every two months for one year.

Expert Contacts: Lee Kats, Tom Vandergon, Pepperdine University; Gary Busteed, NPS and CSUN; Seth Riley, NPS; Robert Fisher, USGS-BRD

Work to be conducted at CABR

Pitfall trapping efforts are already underway at CABR in cooperation with the USGS-BRD. In particular, 17 arrays have been installed at CABR and adjacent lands of the PLER. These sites are currently being sampled by NPS biologists, volunteers, and USGS-BRD researchers. Funds from the biological inventory project will be used to continue monitoring these sites to achieve inventory objectives. In addition, other directed searches will be implemented to further evaluate the presence of species not expected from the pitfall trap arrays.

Expert Contact: Robert Fisher, USGS-BRD

Work to be conducted at CHIS

For CHIS, Santa Cruz, Santa Rosa and San Miguel Islands are the primary sampling regions and reptile and amphibian surveys will be focused in representative habitats of these three islands. Of these islands, Santa Cruz and Santa Rosa are the highest priority and will require the greatest sampling effort. San Miguel Island has more herpetological data than the other two islands, but has introduced black rats, which likely affect reptile and amphibian populations. Sufficient herpetological surveys have already been completed on Anacapa and Santa Barbara Islands.

In FY 2001, detailed methods will be determined to most effectively sample the reptiles and amphibians on the islands given the existing data available and the environmental constraints of establishing arrays at CHIS. Assuming that pitfall trap arrays are utilized, an approximate sampling effort of the following

has been estimated, stratified among habitat types: East Santa Cruz Island, 10 arrays; West Santa Cruz Island, 20 to 30 arrays; Santa Rosa Island, 20 to 30 arrays; San Miguel Island, 10 arrays. On Santa Cruz and Santa Rosa Islands, surveys would include marking gopher snakes to get absolute abundance estimates. Surveys would be conducted for seven days every two months for one year.

Expert Contacts: Robert Fisher, USGS-BRD; Paul Collins, SBMNH; Charles Drost, USGS-BRD

Project III.E.1 Total Estimated Time to Complete: 2 years
Project III.E.1 Total Estimated Costs (all parks, both years): $ 91,871

- **Total Cost FY2001(SAMO and CABR): $ 33,573**
- **Total Cost FY2002 (CHIS): $ 58,298**

Project III.E.1 Total Requested Funds: $ 91,871

III.F. Fish

Project III.F.1: **Review and compile existing information (all parks).**

Fiscal Year(s) of Implementation: 2001

Inventory Objectives and Rationale**:** To improve knowledge of presence, distribution, and abundance estimates of all fish species for all three parks. During the first stage of this inventory, some existing information was gathered and entered into the NPSpecies database. Workshop participants assessed this information and identified problems and information gaps and, where possible, existing sources to fill those gaps. The information gaps and information sources vary for each park.

CABR has few fish records with evidence in the NPSpecies database. Voucher specimens reside at Scripps Institute of Oceanography and possibly the Los Angeles County Museum of Natural History (LACMNH) and SDSU. Voucher specimens need to be assessed for location details and entered into the NPSpecies database. CHIS has a small percentage of fish records with evidence. Collections at LACMNH , SDMNH and UCSB need to be searched. Searches may lead to additional repositories of smaller, but important collections. More than half of the fish records are evidenced for SAMO. Additional searches at the LACMNH, California Academy of Sciences and other institutions will uncover additional evidence for fishes in SAMO streams and lagoons.

Completing the data gathering and compilation summarized above will fill in many of the identified knowledge gaps in a cost-effective manner and efficiently guide field work where existing knowledge is not sufficient to meet overall network objectives.

Methods**:** To improve presence information, collaborative searches will be conducted for all three parks at various institutions (e.g. Scripps Institute of Oceanography, UCSB, Santa Barbara Museum of Natural History (SBMNH), LACMNH, SDMNH, California Academy of Sciences). Results will

determine whether limited additional searches at more distant institutions are needed (e.g. University of Michigan).

The work for all three parks could be completed by hiring a GS-7 Biological Technician for approximately 4 months or, alternatively, by contracting the entire project.

***Expert Contacts**:* Cindy Klepaldo, Scripps Institute of Oceanography; Gary Davis, NPS; Camm Swift, LACMNH, retired; Milton Love, Jack Engle, UCSB; Mike Shane, HUBBS-Sea World Research Institute; Dan Pondella, Occidental College

Project III.F.1 Total Estimated Time to Complete: 4 months
Project III.F.1 Total Estimated Cost: $ 15,675
Project III.F.1 Total Requested Funds: $ 15,675

Project III.F.2: **Stream/lagoon surveys for abundance and distribution of native and alien fishes at SAMO.**

Fiscal Year(s) of Implementation: 2003

***Inventory Objectives and Rationale**:* To determine distributions of native and alien fish at SAMO. Native fish populations have been impacted by habitat loss, reductions in water quality and predation by introduced exotic species. Two species, the tidewater goby and the Southern California steelhead trout, are federally endangered. Absolute abundance by habitat is needed to track status and trend of these species and determine recovery actions. Alien fish species significantly alter aquatic environments and are a threat to native amphibians and fish. Knowledge of distribution and absolute abundance is critical to implementing management actions to protect native species.

***Methods**:* To improve precision of native fish distribution information by determining their extent in large drainages and their presence/absence in small drainages, > ten percent of streams will be randomly selected and censused and all three lagoons will be censused. For non-native fishes, surveys will determine distribution and relative abundance. Seines are the preferred sampling tool, but electro-shocking may be used in selected areas. In each sampled stream, fishes will be counted and identified to the species level, and locations determined by GPS. Surveys will be conducted in the fall during a three-week period before winter rains begin. Voucher specimens will be collected and prepared for accession according to NPS collection standards. Additionally, existing databases (e.g. CDFG, LACMNH, USGS, United States Forest Service and American Fisheries Society) will be reviewed and mined for abundance and distributional data.

Expert Contacts: Kevin Lafferty, USGS, UCSB; Richard Ambrose, UCLA; Camm Swift, LACMNH, retired.

Project III.F.2 Total Estimated Time to Complete: 12 months

Project III.F.2 Total Estimated Cost: $ 40,000
Project III.F.2 Total Requested Funds: $ 20,000

Project III.F.3: **Survey intertidal and shallow (< 40 m) subtidal for fishes at CABR and CHIS.**

Fiscal Year(s) of Implementation: 2003

Inventory Objectives and Rationale: To determine distribution and relative abundance categories by habitat type. CABR has almost no data on fish species. The rocky intertidal monitoring program does not include marine fish. Baseline data are needed on what species of fish we have, where, when, and basic age class to evaluate the function of this marine reserve in a larger context. For CHIS, additional information on fish distribution in other habitats, juvenile recruitment dynamics, and population age structure is needed to characterize and assess the health of park ecosystems.

Methods: This project involves surveying in the shallow water areas off the coast at CABR and CHIS. At CABR, surveys should be conducted in the intertidal and subtidal zones. At CHIS, surveys should be conducted in the transition areas (where cold water meets warm). Initially, exploratory studies should be conducted which would include trapping and remote video surveillance at high and low tide. In the intertidal zone at CHIS, larval surveys would be conducted 24 times in each of 6 zones with 3 tows per zone for a total of 432 samples. Surveys would be conducted monthly. Vouchers would be brought back to the laboratory for identification and sorting. In both parks, low tide intertidal surveys should include surveying approximately 10 percent of 6-8 tidepools. Samples should be taken twice a year for 3 days at a time. Laboratory work (identifying and preparing voucher specimens) should take an additional 2-3 days. Subtidal surveys should include establishing 3 transects in 3 zones. Surveys should be conducted twice a year in spring and fall. Data should be collected using visual or remote video or nets. If using nets, surveys should consist of establishing 3 variable mesh nets in each of 3 zones. Nets would be cast overnight. Survey work should also include collecting additional voucher specimens using Rotenone or CO_2 for small, cryptic species. Additional surveys would include creel census surveys using hook and line or traps. Samples should be taken 3 times per year: late spring, summer, and fall. Effort should include 2 sampling days per season.

Expert Contacts: Jeff Moser, National Marine Fisheries Service; LACMNH; Dan Pondella, Occidental College

Project III.F.3 Total Estimated Time to Complete: 12 months
Project III.F.3 Total Estimated Cost: $ 30,000
Project III.F.3 Total Requested Funds: $ 12,000

Project III.F.4: **Survey deepwater (40-400 m) for fishes at CHIS.**

Fiscal Year(s) of Implementation: 2003

Inventory Objectives and Rationale: To determine distribution and relative abundance of deepwater fishes at CHIS. Legal fishing annually removes thousands of tons of fish, shellfish, and kelp from the park. The effects of this activity are unknown, but appear to be detrimental, threatening normal ecosystem structure and functioning. The park has measured population densities of three species of demersal fish since 1982, and an additional 13 kelp forest fishes since 1985. Relative abundance of all fishes has been recorded at 16 kelp forest sites since 1996. Additional information on fish distribution in other habitats, especially deeper than SCUBS depths (43 m), juvenile recruitment dynamics, and population age structure is needed to characterize and assess the health of park ecosystems.

Methods: This project requires use of a ship to sample deep water habitats off the coast at CHIS. Surveys would be conducted using nets, traps, longlines, and hook and line to capture fish species. Additionally, surveys could include the use of a small submersible. This project would also involve reviewing existing databases and data sources to glean additional information.

Expert Contacts: Milton Love, UCSB; Gary Davis, NPS; Robert Lea, CDFG

Project III.F.4 Total Estimated Time to Complete: 12 months
Project III.F.4 Total Estimated Cost: $ 90,000
Project III.F.4 Total Requested Funds: $ 0

IV. STRATEGY TO ACQUIRE AND MANAGE INVENTORY INFORMATION

Logistical and coordination requirements of the study plan are addressed in this section. In the first part, the level of staffing needed to implement the plan successfully is identified, followed by a discussion of program management and how the network should coordinate throughout the course of study. We recommend one model that could work efficiently. In the second part, project priorities are discussed along with the project and task completion schedule.

IV.A. Staffing and program coordination

IV.A.1. Staffing

The complexity and temporal scope of this inventory program requires a high degree of coordination and organization to ensure its successful implementation. The program also creates an additional and substantial workload for the parks within the network. Therefore, we suggest hiring a Program Coordinator for the life of the project. Ideally, this person will have excellent organizational skills, data management experience, and an ability to coordinate multiple aspects of scientific studies. This person will be housed at one park and coordinate with other parks in the network throughout the course of the project. We have budgeted for a GS-11 position for this purpose.

The main responsibilities of this position would be to implement all aspects of the study plan. This would include:

(1) ensuring that all data collected during inventory projects are processed in a timely manner and recorded in appropriate format,

(2) ensuring that all park inventory databases are maintained and updated on an on-going basis,

(3) conducting annual or semi-annual meetings to schedule development of sampling methods for the project,

(4) developing requests for proposals and detailed project statements for upcoming projects,

(5) overseeing all contracting and development of cooperative agreements, and

(6) coordinating and generally overseeing implementation of inventory projects.

This person would ultimately be responsible for ensuring that all work identified in the study plan would be delivered according to schedule. Additional responsibilities would include: reviewing proposal bids, coordinating with other parks to select contractors, managing the projects, overseeing fund disbursement, and managing budgets,.

We have also budgeted for several technicians to implement the study plan. The Program Coordinator would be responsible for coordinating their work.

IV.A.2. Program Coordination

The Program Coordinator will establish a steering committee made up of natural resource staff from each of the parks in the network. He/she will meet with the committee regularly to apprise them of progress, identify priorities, and discuss project implementation. Steering committee members would advise the Program Coordinator on setting annual priorities and provide logistical support within their parks. The committee would also assist the Program Coordinator in preparing requests for proposals and cooperative agreements. The Program Coordinator would work with the committee to ensure that staff in individual parks are completing their work in a timely and acceptable manner.

Several projects and tasks identified within this study plan can and should be conducted with as much coordination as possible between parks. For example, several projects identify work to be conducted in

all three parks, but should be coordinated out of one park. Other tasks, such as database management, are shared tasks that require combining resources and coordinating input. Prior to initiation of any project, the steering committee should coordinate with the Program Coordinator to determine the administrative responsibilities for each park.

As mentioned in a previous section, this study plan represents the most comprehensive completion of the NPSpecies database to date. However, this database will necessarily be updated periodically and submitted to the national NPSpecies database as directed in the NPS Inventory and Monitoring program guidelines.

Currently, each park maintains its own copy of NPSpecies. We recommend each park continue to do so and refrain from centralizing this task to one park. This allows each park to maintain its records as efficiently and accurately as possible. For the duration of the biological inventory, the Program Coordinator will work with park staff and inventory technicians to ensure that each park's NPSpecies database is updated regularly and revised versions submitted at least annually to the national NPSpecies database.

IV.B. Project Priorities and Completion Schedule

In this document we identified 17 projects necessary to meet inventory objectives and achieve a 90 percent species-documentation criterion. Recognizing that not all projects could be implemented simultaneously, the Network Team assigned priorities to each project and determined an implementation schedule. Criteria used to assign priorities and a list of projects with their scheduled dates of implementation will be discussed in the following sections.

IV.B.1. Project Priorities

The highest priority projects were those that meet the following criteria:

(1) Projects that provide a high return (i.e. most valuable or prodigious amounts of data) on the money and time invested,

(2) Projects that serve all parks within the network (i.e. provide information that could be used by all parks), and

(3) Projects that address immediate threats to a particular resource.

Projects that meet all three of these criteria are scheduled to occur in the first fiscal year (FY2001). Projects that meet only one or two of the criteria are scheduled to occur in successive years. In this approach, priority level is concomitant with the implementation date (i.e. the later the implementation date, the lower the priority).

The highest priority projects (those to be conducted during the first fiscal year) are: (1) conduct herpetological surveys in all three parks, and (2) review and compile existing data on plants, birds and fish for all three parks. Reptile and amphibian surveying were chosen because surveys are currently underway in two of the three parks reducing the need for additional start-up costs. Additionally, reptile and amphibian populations are declining globally and have been shown to be sensitive to human disturbance. The MCN feel that these circumstances make the herpetological surveying a high priority.

The MCN also agreed that reviewing and compiling existing information for plants, birds, and fish is extremely important. The MCN felt that large amounts of data have already been collected and need to be reviewed, updated and assembled. This approach reduces the need for additional expensive field surveys. Additionally, the information gathered in this project would assist the network in designing additional studies in the future.

In general, emphasis was placed on (1) gathering basic presence/absence information on all species and (2) acquiring more detailed information for taxa of most concern to the network. Full funding is requested for the projects which contribute to goal one (i.e. basic information on all species). Projects which add more detailed abundance and distribution information are funded for the highest priority taxa, while some of the lower priority projects are allocated reduced or zero funding. However these "lower priority" projects are still critical to a full biological inventory and, thus the projects and cost estimates remain in the plan. These projects are scheduled for the third and fourth years (FY2003 and FY2004) to allow time for the network to seek funding from other sources.

IV.B.2. Project Completion Schedule

The MCN identified an implementation schedule for the projects and tasks identified in this study plan. These are presented in Table 8.

Table 8. Mediterranean Coast Network project and task implementation schedule for FY2001-FY2004.

Task or Project Title	**Fiscal Year in which task or project is to be completed**			
Task	**2001**	**2002**	**2003**	**2004**
Hire/Identify Program Coordinator and Staff	•			
Assemble Steering Committee	•			
Agree on project management and administration	•			
Develop requests for proposals and cooperative agreements	•	•	•	•
Review bids and award contracts	•	•	•	•

Organize/conduct annual coordination meeting	•	•	•	•
Develop workplan/budget for current year	•	•	•	•
Review progress -Determine if 90 % criterion is met -Revise study plans as necessary	•	•	•	•
Prepare annual report	•	•	•	•
Update NPSpecies	•	•	•	•
Project Title				
Review and compile existing information (plants)	•			
Identify, collect and process voucher specimens (plants)	•	•	•	
Document bird species checklists	•			
Survey reptiles and amphibians	•	•		
Review and compile existing information (fish)	•			
Bat surveys		•		
Threatened, endangered, and sensitive surveys (plants)		•	•	•
Invasive exotic species surveys (plants)		•	•	•
Riparian understory shrub and herbaceous plant species surveys (SAMO)			•	
Breeding raptor inventory			•	
Stream/lagoon surveys for abundance and distribution of native and alien fishes (SAMO)			•	
Survey intertidal and shallow subtidal for fishes (CABR and CHIS)			•	
Survey deepwater for fishes (CHIS)			•	
Rare, sensitive, and island endemic bird species inventory				•
Migratory bird inventory				•
Small mammal surveys (CABR)				•
Small mammal and endemic carnivore studies (CHIS)				•

V. BUDGET

A general budget for the projects identified in this study plan is provided in this section. We have also provided detailed budget summaries for projects to be conducted in the first fiscal year. The funding amount requested for all the projects equals the total allocation available for MCN from the Inventory

and Monitoring program minus monies requested in FY00 for development of the study plan and assessment/compilation of existing information.

The MCN realizes that the total program budget exceeds the national Inventory and Monitoring program allocation for this network. However, the amount requested is the minimum required to fully implement this inventory program. The MCN will use the funds requested from the Inventory and Monitoring program to fund the highest priority projects, but will need to seek additional funds for unfunded work identified in this plan. By using Inventory and Monitoring program dollars to leverage outside sources and by seeking additional funds to support earlier phases of the overall inventory effort, the MCN is confident that the additional funds needed to fully implement the program can be obtained.

V.A. Program Budget (All Projects)

An overview of the budget request for all projects in this study plan is presented in Table 9. For all projects, cost estimates were developed by experts with relevant research experience. All costs, except those identified for the first fiscal year, are rough estimates for conducting the studies identified in the plan. Complete budgets for the first year are provided in Tables 10 – 15.

The MCN felt that providing rough estimates for the entire life of the project was the best approach. We anticipate that these will be developed more fully during annual coordination meetings with additional refinement by the investigators conducting the research. This approach provides maximum flexibility necessary for study design and budget allocation.

Additionally, some descriptions for projects scheduled for the third and fourth years of the program (FY2003, FY2004) include cost estimates, but no funding is requested for these projects from the Inventory and Monitoring program. Full implementation of the MCN inventory program will require more funding than has been allocated to the network by the national Inventory and Monitoring program. However these unfunded projects, while lower priority, are still important and the network will actively seek funding from other sources in order to complete the entire program. If additional funding is obtained for funded projects, funding requests may be shifted to unfunded projects in later years.

Table 9. Summary of projected costs for biological inventory projects in the Mediterranean Coast Network (FY2001-FY2004).

Fiscal Year	Project	Project Title / Project Group	Estimated Cost
FY2001	–	*Program Coordinator (GS-11 @ 0.6 FTE)*	$ 39,958
(Year 1)	III.B.1	Review and compile existing information (plants)	$ 77,209

	III.B.2	Identify, collect and process voucher specimens (plants)	$ 12,187
	III.D.1	Document bird species checklists	$ 23,175
	III.E.1	SAMO and CABR – Survey reptiles and amphibians	$ 33,573
	III.F.1	Review and compile existing information (fish)	$ 15,675
	–	Carryover from $146,000 allocation for FY2000*	($52,273)
		Subtotal:	**$149,504**

* FY00 Funds will remain with USGS-BRD in FY01to cover 0.6-0.7 FTE, GS-07 Biological Technician & travel, supplies for FY2001 reptile and amphibian survey (SAMO and CABR), development of detailed methods for FY2002 reptile and amphibian survey (CHIS).

FY2002	–	*Program Coordinator (GS-11 @ 0.5 FTE)*	$ 29,820
(Year 2)	III.B.2	Identify, collect and process voucher specimens (plants)	$ 4,969
	III.B.3	Threatened, endangered and sensitive species surveys (plants)	$ 60,300
	III.B.4	Invasive exotics species surveys (plants)	$ 53,800
	III.C.1	Bat surveys	
		CABR	$ 5,000
		CHIS	$ 30,000
		SAMO	$ 40,000
	III.E.1	CHIS – Survey reptiles and amphibians	$ 58,298
		Subtotal:	**$282,187**
FY2003	–	*Program Coordinator (GS-11 @ 0.5 FTE)*	$ 29,820
(Year 3)	III.B.2	Identify, collect and process voucher specimens (plants)	$ 4,969
	III.B.3	Threatened, endangered and sensitive species surveys (plants)	$ 45,552
	III.B.4	CHIS – Invasive exotics species surveys	$ 11,000
	III.B.5	SAMO – Riparian understory shrub and herbaceous plant species surveys	$ 0
	III.D.3	Breeding raptor inventory	$ 30,000
	III.F.2	SAMO – Stream/lagoon survey for abundance and distribution of native and alien fishes	$ 20,000
	III.F.3	CABR and CHIS – Survey intertidal and shallow (< 40 m) subtidal for fishes	$ 12,000
	III.F.4	CHIS – Survey deepwater (40-400 m) for fishes	$ 0
		Subtotal:	**$153,341**

FY2004	–	*Program Coordinator (GS-11 @ 0.2 FTE)*	$ 0
(Year 4)	III.B.3	Threatened, endangered and sensitive species surveys (plants)	$ 0
	III.B.4	CHIS – Invasive exotics species surveys	$ 0

III.C.2	Small mammal survey on CABR and SAMO	$ 0
III.C.3	Small mammal and endemic carnivore studies at CHIS	$ 0
III.D.2	Rare, sensitive and island endemic bird species inventory	
	CABR	$ 0
	CHIS	$ 0
	SAMO	$ 0
III.D.4	Migratory bird inventory	$ 0
	Subtotal:	**$ 0**
	TOTAL REQUESTED FUNDS:	**$ 585,032**

V.B. Detailed Budgets for Fiscal Year 2001

Table 10 below lists a summarized budget for all projected costs to be incurred during the first fiscal year (FY2001). Tables 11 – 15 list detailed budgets for each project to be conducted the first fiscal year. Personnel costs were based on current government schedules for government employees and include a cost of living adjustment for the Los Angeles area. Permanent or term government salaries include an additional 35 percent benefit cost. Temporary technician salaries are calculated with a 10 percent benefit cost. Other items, such as travel, equipment and supplies, are based on current work and costs incurred to date. Per diem rates are based on the highest allowance in the region in which the studies are to be conducted (i.e. Los Angeles County). Personnel costs for non-government employees (e.g. private contractors) were based on recommendations from private industry. The personnel cost calculation for a cooperative agreement with universities was based on the university salary schedule plus a standard benefit cost and a negotiated university overhead. The GS-7, Step 4 salary is based on existing personnel. Specific contractors are identified (e.g., Santa Barbara Museum of Natural History) for projects that require specific, unique expertise or information (i.e. sole source).

Table 10. Projected inventory costs for the Mediterranean Coast Network (FY2001).

CATEGORY	**COST**
Salaries and Contracts	
Personnel	
Program Coordinator [GS-11 (0.6 FTE)]	$ 39,958
Biological Technician (all projects) [GS-7, step 4 (0.6 FTE)]	$ 29,696
Projects III.B.1 and III.B.2	
Biological Technician (all projects) [GS-7, step 1 (0.6 FTE)]	$ 27,000
Projects III.D.1 and III.F.1	

Biological Technician – Project III.B.1 [GS-5 (0.2 FTE)]	$ 6,625
Biological Technician – Project III.E.1 [GS-7, step 1 (0.5 FTE)]	$ 20,148
Contract Services	
Contract Salary (Botanist) – Project III.B.1	$ 26,000
Overhead	$ 7,800
Consultant (Botanist) – Project III.B.1	$ 4,750
Consultant (Botanist) – Project III.B.2	$ 4,000
Direct Costs	
Transportation	
Vehicle Rental	$ 1,600
GSA Vehicle	$ 2,750
Travel	
Per Diem	$ 10,150
Vehicle Mileage	$ 2,600
Processing – Project III.B.2	$ 2,700
Contract with Santa Barbara Museum of Natural History	$ 7,500
Pitfall Trap Supplies	$ 6,000
Directed searches at CABR for species not captured in pitfall arrays	$ 2,500
TOTAL (FY2001):	**$ 201,777**
TOTAL REQUESTED ($52,273 of unspent FY00 funds available for FY01)	**$149,504**

Table 11. Detailed budget summary for *Project III.B.1: Review and compile existing information (all parks).*

ITEM DESCRIPTION	**COST**
Herbarium searches	
Personnel Salaries	
Technician, GS-7(4) 120 days (~ 6 months)	$ 22,272
Direct Costs	
Transportation	
Vehicle Rental – 10 days @ $ 40 per day	$ 400
Travel	
Per Diem – 15 days @ $ 145 per day	$ 2,175
Vehicle Mileage – 2000 miles @ $ 0.325 per mile	$ 650
Subtotal:	***$ 25,497***
Data conversion for incomplete CHIS databases	
Personnel Salaries	
CHIS – Technician, GS-5 temporary 60 days (~ 3 months)	$ 6,625

Direct Costs	
Travel	
Vehicle Mileage – 2000 miles @ $ 0.325 per mile	$ 650
Subtotal:	***$ 7,275***
Analyze monitoring data for CABR	
Personnel Salaries	
Technician, GS-7(4) 20 days (~ 1 month)	$ 3,712
Direct Costs	
Transportation	
Vehicle Rental – 10 days @ $ 40 per day	$ 400
Travel	
Per Diem – 10 days @ $ 145 per day	$ 1,450
Subtotal:	***$ 5,562***
Verify and expand plant species information for the Santa Monica Mountains and Simi Hills through a cooperative agreement	
Personnel Salaries	
University Botanist (6 months)	$ 26,000
Overhead	$ 7,800
Consultant Time 50 hours @ $ 95 per hour	$ 4,750
Direct Costs	
Travel	
Vehicle Mileage – 1000 miles @ $ 0.325 per mile	$ 325
Subtotal:	***$ 38,875***
Project III.B.1 Subtotal:	**$ 77,209**

Table 12. Detailed budget summary for *Project III.B.2: Identify, collect and process voucher specimens (all parks) – year 1.*

ITEM DESCRIPTION	COST
Personnel Salaries	
Technician (NPSpecies), GS-7(4) 20 days (~ 1 month)	$ 3,712
Consultant Time 20 days @ $ 200 per day	$ 4,000
Direct Costs	
Processing	$ 2,700
Travel	
Per Diem – 10 days @ $ 145 per day	$ 1,450

Vehicle Mileage – 1000 miles @ $ 0.325 per mile	$ 325
Project III.B.2 Subtotal:	**$ 12,187**

Table 13. Detailed budget summary for *Project III.D.1: Document bird species checklists (all parks).*

ITEM DESCRIPTION	COST
Personnel Salaries	
Technician, GS-7 80 days (~ 4 months)	$ 13,500
Direct Costs	
Contract with Santa Barbara Museum of Natural History	$ 7,500
Transportation	
Vehicle Rental – 10 days @ $ 40 per day	$ 400
Travel	
Per Diem – 10 days @ $ 145 per day	$ 1,450
Vehicle Mileage – 1000 miles @ $ 0.325 per mile	$ 325
Project III.C.1 Subtotal:	**$ 23,175**

Table 14. Detailed budget summary for *Project III.E.1: Survey reptiles and amphibians (all parks) – year 1*.

ITEM DESCRIPTION	COST
Personnel Salaries	
Technician, GS-7 120 days (~ 6 months)	$ 20,148
Direct Costs	
Pitfall Trap Supplies	
SAMO – 20 Arrays @ $ 300 per array	$ 6,000
Directed searches at CABR for species not captured in pitfall trap arrays	$ 2,500
Transportation	
GSA Vehicle	$ 2,750
Travel	
Per Diem	

SAMO – 15 days @ $ 145 per day	$ 2,175
Project III.E.1 Subtotal:	**$ 33,573**

Table 15. Detailed budget summary for *Project III.F.1: Review and compilation of existing (fish) information (all parks).*

ITEM DESCRIPTION	COST
Personnel Salaries	
Technician, GS-7 80 days (~ 4 months)	$ 13,500
Direct Costs	
Transportation	
Vehicle Rental – 10 days @ $ 40 per day	$ 400
Travel	
Per Diem – 10 days @ $ 145 per day	$ 1,450
Vehicle Mileage – 1000 miles @ $ 0.325 per mile	$ 325
Project III.F.1 Subtotal:	**$ 15,675**

VI. PRODUCTS AND REPORTING PROCEDURES

VI.A Deliverables

The main thrust of this inventory effort is to provide information to parks within the Mediterranean Coast Network. Parks will use this information to manage and protect resources more effectively. As such, all projects listed in this study plan will generate data on the five taxonomic groups identified. Following is a list of the types of products and outputs of the biological inventory project for the Mediterranean Coast Network. An overview of the minimum set of deliverables and their scheduled delivery dates is presented in Table 16.

1. Progress reports:

   These may be biannual or annual, depending upon the taxa and progress of field work and data compilation. These will be submitted by principal investigators and staff to the Inventory Program Coordinator for archiving and transmission up the chain (network, park, region, national).

2. Final report:

The Program Coordinator will prepare a final report in FY2004 at the end of the five year inventory effort. The structure of the final report is to be determined, but at a minimum it will include summaries of each of the taxa, field work and inventory/metadata of materials and information submitted to the Data Set Catalog and NPSpecies. Bibliographic information will be updated into NRBib and the ANCS+ catalog records will be updated. If required, this information (excluding sensitive data) will be available in a format to upload to the NPS Website. GIS products will conform to the I&M specifications for the ArcView GIS data browser extension.

3. GPS data:

Minimal data/products from GPS collection will include original rover files, base files, differentially corrected files (where applicable) or original files with RTCM included, on diskette, zip drive, or CD. Original field notebooks, notes and photographs along with accompanying documentation will be required to be inventoried and submitted to the Program Coordinator. He/she will coordinate with park staff to enter this information into the records of each park's database for copying and archiving. Products of the GPS data will include ArcView Shape files, graphics and derived products in various formats depending upon user, need and audience. Metadata about this information will be available to upload into the Dataset Catalog.

4. GIS themes and Microsoft Access databases:

These will be developed and populated from field data and the historical records and documents incorporated into databases. Attribute field data for the various taxa will be entered into a relational database by individual project staff. Preliminary QA/QC will be done by project field crews and reviewed and approved by the Program Coordinator. Upon approval, this material along with associated field records, documents, maps, raw data, photographs etc. will be entered into each park's database in electronic format.

Data for all parks will be archived and managed by the Program Coordinator with cooperation from staff at each park. Relational database files for all parks that are ready for ArcView production and storage will be maintained individually at each park.

All GIS data will be compatible with ArcView 3.2. Access databases will be maintained on the most current NPS standard platform and version. Initial database entry will be done by project staff and checked by the project coordinator. After the inventory period, responsibility for database care, maintenance and feeding will revert to individual park staff.

5. Storage/Archiving:

Each park will individually archive and store original field data and derived digital products. The Program Coordinator will coordinate with each park to transmit digital products to WASO NRID for permanent archiving. Backup protocols for data and information will be implemented, including secure, off-site storage for all digital information.

6. Linkage with NRID Inventory and Monitoring Databases:

Data from the biological inventories will be maintained in various databases and formats. The linkages between the major databases will be critical to making the information available to the widest audience and widest range of uses. The primary linkages between the Dataset Catalog, the NRBib, the NPSpecies and the permits database will allow query, evaluation, analysis and, in the long term, linkage to other critical pathways such as Synthesis, the Investigator's Annual Reports Database; the Blue Angel Gateway to move information to the WWW; the Voyager Library Database and the Park Profile databases launched from the NPS Web pages. In turn, the availability of this information will strengthen and serve to sustain the Natural Resource Challenge.

– NPSpecies: This database will be maintained at each park; the Program Coordinator will work with inventory project staff to update the database when necessary, depending on the data generated by each individual project. This work will be coordinated with park staff.

– ANCS+ (Automated National Cataloging System): All parks participating in the MCN have access to the ANCS+ software and database system. The update process for collections and related items (voucher specimens, photographs etc.) will be coordinated by the Program Coordinator with assistance from inventory and park staff.

– NRBib (Natural Resources Bibliography): Ongoing updates to this bibliography will take place as materials are reviewed and records created. ProCite software serves as the standard platform for this bibliography. All parks in the MCN have access to this software and to NRBib. Entries may be submitted by each park or an annual update can be processed by the Program Coordinator.

– Dataset Catalog: This catalog has recently been launched – information for this catalog or park holdings and associated metadata will be updated and maintained by the Program Coordinator with assistance from park and project staff as field information is collected, checked and processed. With the inventory in early stages, there is sufficient staff to maintain this activity. The budget and plan has incorporated additional funds and staff in various capacities to update and transfer data to supplement this process.

– Metadata: Complete FGDC-compliant metadata will be recorded for all geographic data developed during the inventory. The metadata will be entered and parsed for each park using the individual park's preferred metadata development tool. Metadata for non-geographic data will also be collected. A form will be developed for the MCN to guide metadata collection for any team gathering data related to the inventory.

7. Database updates and maintenance:

Updates and maintenance of the park specific databases will be coordinated by the Program Coordinator utilizing current staff. Individual parks will work with him/her to upload data, upgrade databases, archive data, maintain metadata and transmit to WASO NRID.

Table 16. List of biological inventory products and scheduled delivery dates (FY2001-FY2004).

Product Description	Completion Date by Fiscal Year			
	FY01	FY02	FY03	FY04
Final Biological Inventory Report				●
Project Progress Reports	●	●	●	●
NPSpecies updates/reports for 5 taxonomic groups	●	●	●	●
GIS plant database/maps at CHIS	●			
Vegetation community characterization CABR	●			
Updated flora for SAMO	●			
Plant voucher specimens (all parks)			●	
GIS database of weed species (all parks)				●
GIS database of Breeding Raptor nest sites (all parks)			●	
Mist net stations (all parks)				●
NRBibliography updates	●	●	●	●
Dataset Catalog updates	●	●	●	●

VI.B. Voucher Policy

Several of the proposed projects in this study plan may involve the collection or processing of existing voucher specimens. Because of the scientific importance of this task, the MCN provides the following guidelines for working with vouchers during the life of this project. In this section we discuss the methods by which vouchers will be collected, processed, and stored.

For documenting species occurrences, vouchers represent the most concrete evidence available. Vouchers may be an actual specimen (collected and preserved) or a photograph. All voucher specimens will be georeferenced. The network is actively gathering information, from a variety of sources, on existing specimen vouchers for park species.

Cooperators and contractors will be required to collect adequate vouchers to document species occurrence, but extensive vouchering to document the full range of phenotypic variability will not be undertaken. Final decisions regarding the appropriate repository for each taxon have not been made. However, several facilities exist which would most likely accept and encourage vouchers resulting from this project. The Program Coordinator will facilitate this effort through contacts with the major regional herbaria and museums.

Voucher preparation will be the responsibility of inventory contractors and cooperators and must follow guidelines outlined in NPS Management Policies, Museum Objects and Library Materials (5:9-11); Security and Protective Measures (5:12-13); Preservation of Data and Collections and Protection of

Research Potential (5:3-4) Chapter 5 and NPS 77, the Natural Resource Management Guideline. Permission to take duplicate vouchers will be considered on a case-by-case basis by individual park resource managers. Investigators must have a valid park collection permit to collect specimens. All vouchers taken on NPS lands, regardless of their final repository, are the property of the NPS. The Program Coordinator (working with park personnel) will be responsible for accessioning voucher specimens into ANCS.

Vertebrate Collection

An overview of collection guidelines for each vertebrate taxon are described in Table 17, however, detailed information is provided in the following section.

In general, vertebrate vouchers will be taken only if necessary for species identification. One specimen will be considered adequate to document occurrence at a park. Whenever possible, a series of photographs (rather than multiple specimens) will be used to document observed phenotypic variability. Collectors should take advantage of every opportunity to collect and accession road-kill animals and other windfalls of specimens (e.g. flood, prescribed fire). Voucher specimen preparation will follow the accepted standards for each taxon and will be determined by principal investigators with input from the Program Coordinator.

§ ***Bird Vouchers***. Bird voucher specimens will not be collected as part of this inventory effort, except in cases where animals are found dead and in identifiable condition. Instead, to the degree possible we will ask field investigators to acquire voucher photographs. We realize that photographing birds is often not feasible, and that many birds are identified by sound rather than sight. Bird vouchers may be deposited in park collections or larger institutional museums such as Los Angeles County Museum of Natural History and Santa Barbara Museum of Natural History.

§ ***Mammal Vouchers***. For parks that are not scheduled for additional inventory work, we will rely on existing vouchers for documentation (e.g., for NPSpecies) rather than take additional vouchers. There are few significant taxonomic problems for mammals in the network that require additional vouchers but these should be taken by principal investigators as approved for research, rather than as part of an inventory or monitoring effort.

However, there should be no mistake that voucher specimens, identified to the extent possible, properly cataloged and accessioned, and deposited in accredited museums are fundamental to an improved understanding of occurrence and distribution of vertebrate species and plants on MCN parks. All new mammal inventory work on MCN parks should be properly vouchered. For species where it is not appropriate (e.g., protected species) or feasible (e.g., large mammals) to take voucher specimens, documentation should be provided in some other form. We will attempt to document such species with voucher photographs of individuals, their sign, or scat. For parks with little or no previous inventory work, we will retain small numbers of all species for which voucher specimens can be prepared. We will salvage dead animals whenever possible (e.g., road-killed animals) and will

work with each park to process material they may have in freezers on-site.

§ ***Reptile and Amphibian Vouchers***. At a minimum, presence of reptile and amphibian species at each park should be documented using high-quality photographs (close-up color slides). Animals found dead and in identifiable condition should also be salvaged as voucher specimens (e.g., those found dead on the road). Depending on park needs, live animals may also be collected and preserved as voucher specimens. This is particularly important when species are found at parks that are not expected, and/or range extensions.

A potential negative side effect of any wildlife research project is injuring or stressing captured animals. Researchers may minimize stress by releasing animals as quickly as possible after capture. There is no reason to mark animals as part of the initial inventory work, but marking is more critical to the success of the future monitoring phase of the I&M projects. All animals captured during monitoring should be marked to assist with detection of long-term population trends, and to assess relative abundance and distribution of local reptiles and amphibians. Lizards may be toe-clipped; snakes may be scale-clipped; and amphibians may be freeze-branded. All of these methods will produce a mark that will be identifiable over at least several years, and none are thought to cause severe pain or long-term suffering to the animals. All procedures for handling the animals will be reviewed and approved by the US Fish and Wildlife Service and California Department of Fish and Game.

Vascular Plant Collection

For species for which suitable voucher specimens do not currently exists, voucher material will be collected over the course of the inventory. Enough plant material should be collected to cover two 39.5 X 29.5 cm herbaria sheets. Roots should be included, where possible, with care taken to leave the remaining plants undisturbed. Flowers or seeds are often necessary for identification and should be collected as needed. For large herbs, shrubs and trees, parts critical for identification must be collected. Plant specimens must be protected from wilting and desiccation prior to placing in a plant press. If phenotypic variability is observed, a short series of each species may be collected.

Collection of Rare Species

Because most rare species exist in very small numbers, taking of those species should be limited to situations when significant benefit to the affected species and/or meaningful new information about the species will result from the taking. For species that are listed on federal or state rare and endangered species lists, specimens shall not be taken without appropriate permits and the express permission of the park resource manager (as specified in collection permit). Photographs, sound recordings, or plant fragments should be used to document occurrence rather than taking whole specimens, except in those cases in which species identification cannot be made based on external characteristics. For vertebrate species, DNA analysis of tissue samples offers another vouchering alternative. When other means of

vouchering are not available, and the investigator has received permission to collect a rare species, only one voucher will be taken to document occurrence at a given park.

§ ***Locally rare species:*** While it is likely that more individuals of a species exist at a site than are actually observed or captured during a survey, the risk of depletion of a local population through collection is greater for a rare species than for more common species. A voucher should only be collected if at least 10 individuals of an animal species, or 10-25 individuals of a plant species are present at a given sample site.

Table 17. Voucher guidelines for vertebrate taxa.

Taxon	***Suggested Vouchers***
Mammals	
Bats	• Wing punch or whole specimens for easily misidentified species, if capture is part of the protocol • Morphometric data, photographs, digital sonograms or cassette tapes with reference calls as evidence of rare bats
Mid-sized carnivores	• Photographs or hair samples, if possible, to help document species occurrence when inventory based on tracks
Other mid-sized mammals	• Whole specimens not necessary
Small mammals	• Three of each species (one per sex and one juvenile); skulls used to differentiate between certain species.
Birds	• Whole specimens not necessary • Visual or song identification by qualified observers (common species) • Photographs and sound recordings of unusual sightings • Complete written description following accepted AOU standards
Reptiles/Amphibians	• Whole specimens if identification difficult, or if trap mortality occurs • Photographs, if diagnostic features clear • Sound recordings (anurans)
Fish	• Whole specimens, if required for identification

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VIII. APPENDICES

Appendix A: Park Species

A.1. NPSpecies – Plantae – Vascular and Non-Vascular

Appendix A.1. NPSpecies Report - Plantae - Vascular and Non-Vascular

TSN	ITIS Latin Name	CABR	CHIS	SAMO
19560	Abronia latifolia		X	
19562	Abronia maritima	X	X	X

19572	Abronia umbellata		X	
19573	Abronia umbellata ssp. umbellata			X
26417	Acacia	X		
26431	Acacia melanoxylon		X	
28748	Acer macrophyllum		X	X
526851	Acer negundo var. californicum			X
35423	Achillea millefolium		X	X
507938	Achnatherum coronatum	X		X
507940	Achnatherum diegoense		X	
36451	Achyrachaena mollis		X	X
36453	Acourtia microcephala		X	X
36459	Acroptilon repens			X
25090	Adenostoma fasciculatum	X		X
182030	Adenostoma fasciculatum var. fasciculatum		X	
-2527	Adenostoma fasciculatum var. prostratum		X	
25091	Adenostoma sparsifolium			X
181788	Adiantum aleuticum		X	
17308	Adiantum capillus-veneris		X	X
17309	Adiantum jordanii	X	X	X
182536	Aegilops cylindrica		X	
506476	Agapanthus africanus	X		
182660	Agave americana		X	
182693	Agave shawii	X		
36465	Ageratina adenophora			X
182403	Agoseris apargioides var. apargioides		X	
36491	Agoseris grandiflora		X	X
36492	Agoseris heterophylla		X	
40412	Agrostis exarata		X	X
40421	Agrostis microphylla		X	
40422	Agrostis pallens	X	X	X
40400	Agrostis stolonifera	X	X	X
508500	Agrostis viridis		X	
28827	Ailanthus altissima			X
26451	Albizia lophantha		X	
21774	Alcea rosea		X	
38894	Alisma plantago-aquatica			X
42676	Allium haematochiton	X		X
42645	Allium lacunosum			X
182612	Allium lacunosum var. lacunosum		X	
531000	Allium peninsulare var. peninsulare			X
42660	Allium praecox		X	
31030	Allophyllum glutinosum		X	X
19473	Alnus rhombifolia			X

20719	Amaranthus albus		X	X
20723	Amaranthus blitoides		X	X
20725	Amaranthus californicus			X
20731	Amaranthus deflexus		X	X
20742	Amaranthus powellii		X	
20745	Amaranthus retroflexus			X
-2012	Amaryllis belladonna		X	
185210	Amblyopappus pusillus	X	X	X
36497	Ambrosia acanthicarpa		X	X
36501	Ambrosia chamissonis	X	X	X
36522	Ambrosia confertiflora			X
36516	Ambrosia psilostachya	X	X	X
27091	Ammannia coccinea			X
40449	Ammophila arenaria			X
182058	Amorpha californica var. californica			X
531246	Amsinckia menziesii var. intermedia		X	X
531247	Amsinckia menziesii var. menziesii	X	X	X
31713	Amsinckia spectabilis		X	
-2528	Amsinckia spectabilis var. spectabilis		X	
24043	Anagallis arvensis	X	X	X
182017	Anagallis minima		X	
182440	Ancistrocarphus filagineus			X
531001	Andropogon glomeratus var. scabriglumis		X	X
18223	Anemopsis californica		X	X
36330	Anthemis cotula		X	X
29586	Anthriscus caucalis			X
33476	Antirrhinum kelloggii		X	
33478	Antirrhinum multiflorum		X	
-2512	Antirrhinum nuttallianum ssp. nuttallianum	X		
525243	Antirrhinum nuttallianum ssp. subsessile		X	
184592	Aphanes arvensis		X	X
184593	Aphanes occidentalis		X	
20679	Aphanisma blitoides	X	X	
29590	Apiastrum angustifolium	X	X	X
29592	Apium graveolens		X	X
30157	Apocynum cannabinum			X
19936	Aptenia cordifolia		X	X
22695	Arabis glabra		X	
184342	Arabis glabra var. glabra			X
22701	Arabis hoffmannii		X	
184452	Arabis sparsiflora var. californica			X
23627	Arbutus menziesii		X	
36544	Arctium		X	
23478	Arctostaphylos confertiflora		X	

183559	Arctostaphylos glandulosa ssp. mollis			X
23485	Arctostaphylos glauca			X
23494	Arctostaphylos insularis		X	
23528	Arctostaphylos tomentosa ssp. insulicola		X	
23529	Arctostaphylos tomentosa ssp. subcordata		X	
23532	Arctostaphylos viridissima		X	
20270	Arenaria serpyllifolia		X	
18916	Argemone munita			X
184601	Argentina egedii ssp. egedii		X	X
41401	Aristida adscensionis		X	X
41416	Aristida divaricata		X	
532286	Aristida ternipes var. hamulosa		X	
184299	Armeria maritima ssp. californica		X	
35451	Artemisia biennis			X
35453	Artemisia californica	X	X	X
35460	Artemisia douglasiana		X	X
35462	Artemisia dracunculus			X
35480	Artemisia nesiotica		X	
35498	Artemisia tridentata	X		X
184246	Arthrocnemum subterminale		X	X
41450	Arundo donax		X	X
30251	Asclepias californica			X
30264	Asclepias eriocarpa			X
30267	Asclepias fascicularis		X	X
42788	Asphodelus fistulosus			X
17330	Aspidotis californica		X	X
17369	Asplenium vespertinum			X
35518	Aster chilensis		X	
35642	Aster radulinus		X	
193336	Aster lanceolatus ssp. hesperus			X
193024	Aster subulatus var. ligulatus		X	X
25443	Astragalus brauntonii			X
25484	Astragalus curtipes		X	
192459	Astragalus didymocarpus var. didymocarpus		X	X
25520	Astragalus gambelianus		X	X
25581	Astragalus miguelensis		X	
192732	Astragalus pycnostachyus var. lanosissimus			X
192776	Astragalus tener var. titi			X
25707	Astragalus traskiae		X	
192787	Astragalus trichopodus ssp. leucopsis	X		
192786	Astragalus trichopodus var. lonchus	X	X	X
192789	Astragalus trichopodus var. phoxus			X
17416	Athyrium filix-femina ssp. cyclosorum		X	

23046	Athysanus pusillus		X	X
20514	Atriplex argentea ssp. expansa		X	
20517	Atriplex californica		X	X
192226	Atriplex canescens var. canescens	X		X
20523	Atriplex coulteri		X	X
192255	Atriplex lentiformis ssp. breweri		X	
192254	Atriplex lentiformis ssp. lentiformis	X		X
20544	Atriplex leucophylla	X	X	X
20546	Atriplex linearis			X
20553	Atriplex pacifica		X	
20559	Atriplex polycarpa			X
192279	Atriplex prostrata		X	X
20563	Atriplex rosea			X
20565	Atriplex semibaccata	X	X	X
192259	Atriplex serenana var. davidsonii		X	
192261	Atriplex serenana var. serenana		X	X
20573	Atriplex triangularis		X	
20580	Atriplex watsonii		X	X
41456	Avena barbata	X	X	X
41458	Avena fatua	X	X	X
41459	Avena sativa		X	X
18007	Azolla filiculoides			X
35687	Baccharis douglasii		X	X
35688	Baccharis emoryi		X	
507584	Baccharis malibuensis			X
35693	Baccharis pilularis	X	X	X
35695	Baccharis pilularis ssp. consanguinea		X	
35696	Baccharis plummerae			X
524892	Baccharis plummerae ssp. plummerae		X	
183763	Baccharis salicifolia	X	X	X
35699	Baccharis sarothroides	X		
35700	Baccharis sergiloides			X
22740	Barbarea orthoceras			X
20588	Bassia hyssopifolia	X		X
192295	Batis maritima			X
18829	Berberis pinnata ssp. insularis		X	
192207	Bergerocactus emoryi	X		
29596	Berula erecta		X	X
20681	Beta vulgaris		X	X
35707	Bidens frondosa			X
35711	Bidens laevis			X
35731	Bidens pilosa			X
-2513	Bidens pilosa var. pilosa	X		
526932	Blennosperma nanum var. nanum		X	

42790	Bloomeria crocea		X	X
508145	Bolboschoenus maritimus			X
507757	Bolboschoenus robustus			X
34271	Boschniakia strobilacea		X	
41483	Bothriochloa barbinodis	X		X
29601	Bowlesia incana		X	X
501037	Boykinia occidentalis			X
24317	Boykinia rotundifolia			X
41330	Brachypodium distachyon		X	X
23061	Brassica nigra	X	X	X
23063	Brassica rapa		X	
526965	Brassica rapa var. rapa			X
23064	Brassica tournefortii			X
36866	Brickellia californica	X	X	X
36890	Brickellia nevinii			X
41531	Briza minor			X
42810	Brodiaea jolonensis		X	X
40493	Bromus arizonicus		X	X
501063	Bromus berterianus		X	X
40481	Bromus carinatus		X	X
-2514	Bromus carinatus var. carinatus	X		
-2529	Bromus carinatus var. carinatus		X	
532714	Bromus carinatus var. maritimus		X	
501066	Bromus catharticus		X	X
40498	Bromus diandrus	X	X	X
501070	Bromus hordeaceus	X	X	
523697	Bromus hordeaceus ssp. hordeaceus			X
40484	Bromus laevipes		X	X
40506	Bromus madritensis			X
-2543	Bromus madritensis ssp. madritensis		X	
525345	Bromus madritensis ssp. rubens	X	X	
501075	Bromus maritimus		X	
40518	Bromus rubens		X	X
40521	Bromus stamineus		X	
40524	Bromus tectorum			X
40525	Bromus trinii		X	
40527	Bromus vulgaris		X	
29914	Buddleja davidii			X
501089	Buddleja saligna			X
22755	Cakile edentula	X	X	
22764	Cakile maritima		X	X
40540	Calamagrostis rubescens		X	
20463	Calandrinia breweri	X	X	X
20464	Calandrinia ciliata		X	X

20465	Calandrinia maritima	X	X	
501120	Calibrachoa parviflora		X	X
506162	Callistemon citrinus	X		
32059	Callitriche marginata			X
42824	Calochortus albus		X	X
42825	Calochortus catalinae		X	X
527018	Calochortus clavatus var. pallidus			X
42857	Calochortus luteus		X	
42866	Calochortus plummerae			X
42869	Calochortus splendens			X
42875	Calochortus venustus			X
527034	Calochortus weedii var. weedii	X		
20467	Calyptridium monandrum		X	
30671	Calystegia macrostegia	X		
30673	Calystegia macrostegia ssp. amplissima		X	
30675	Calystegia macrostegia ssp. cyclostegia			X
30672	Calystegia macrostegia ssp. macrostegia		X	
30687	Calystegia purpurata ssp. purpurata			X
30692	Calystegia soldanella		X	X
22599	Camelina microcarpa			X
27466	Camissonia bistorta	X		X
27471	Camissonia boothii ssp. decorticans			X
27479	Camissonia californica	X	X	X
27488	Camissonia cheiranthifolia ssp. cheiranthifol		X	
27489	Camissonia cheiranthifolia ssp. suffruticosa	X		X
27514	Camissonia hirtella		X	X
27515	Camissonia ignota		X	X
27517	Camissonia intermedia		X	X
27522	Camissonia lewisii	X		X
27525	Camissonia micrantha		X	X
27542	Camissonia robusta	X	X	
27554	Camissonia strigulosa		X	X
19109	Cannabis sativa		X	X
22766	Capsella bursa-pastoris		X	X
22782	Cardamine californica			X
22783	Cardamine californica var. californica	X	X	
22805	Cardamine oligosperma		X	
527058	Cardamine oligosperma var. oligosperma			X
23072	Cardaria draba		X	X
23073	Cardaria pubescens			X
501198	Cardionema ramosissimum	X	X	X
35788	Carduus pycnocephalus		X	X
39369	Carex	X		

39474	Carex abrupta		X	
39517	Carex barbarae		X	X
39617	Carex globosa		X	X
39619	Carex gracilior		X	
39628	Carex harfordii		X	
39740	Carex pansa		X	
39767	Carex praegracilis		X	X
39801	Carex senta		X	X
39813	Carex spissa			X
39825	Carex subbracteata		X	
39852	Carex triquetra		X	X
39855	Carex tumulicola		X	
30166	Carissa grandiflora	X		
507568	Carpobrotus chilensis		X	X
19934	Carpobrotus edulis	X	X	X
525149	Castilleja affinis ssp. affinis		X	X
-2098	Castilleja affinis X mollis		X	
525154	Castilleja applegatei ssp. martinii			X
506876	Castilleja attenuata		X	
506879	Castilleja densiflora		X	
524900	Castilleja densiflora ssp. densiflora			X
506880	Castilleja exserta		X	
524903	Castilleja exserta ssp. exserta			X
33117	Castilleja foliolosa	X		X
33125	Castilleja hololeuca		X	
525158	Castilleja lanata ssp. hololeuca		X	
525163	Castilleja minor ssp. spiralis			X
33147	Castilleja mollis		X	
531273	Caulanthus heterophyllus var. heterophyllus			X
28455	Ceanothus arboreus		X	
28459	Ceanothus crassifolius			X
28460	Ceanothus cuneatus			X
28482	Ceanothus leucodermis			X
28488	Ceanothus megacarpus			X
531487	Ceanothus megacarpus var. insularis		X	
531452	Ceanothus megacarpus var. megacarpus		X	
28492	Ceanothus oliganthus			X
28511	Ceanothus spinosus			X
28514	Ceanothus tomentosus	X		
28518	Ceanothus verrucosus	X		
36965	Centaurea melitensis	X	X	X
36972	Centaurea solstitialis	X	X	X
30029	Centaurium davyi		X	

30030	Centaurium exaltatum		X	
30032	Centaurium muehlenbergii		X	
30041	Centaurium venustum	X		X
35374	Centranthus ruber		X	X
24046	Centunculus minimus		X	
19955	Cerastium glomeratum		X	X
195861	Cercocarpus betuloides var. blancheae		X	
25135	Cercocarpus minutiflorus	X		
527244	Cercocarpus montanus var. blancheae		X	X
195863	Cercocarpus montanus var. glaber		X	X
36984	Chaenactis artemisiifolia			X
527251	Chaenactis glabriuscula var. glabriuscula	X		X
527253	Chaenactis glabriuscula var. lanosa		X	
25139	Chamaebatia australis			X
501400	Chamaesyce albomarginata	X		X
501435	Chamaesyce maculata		X	X
501436	Chamaesyce melanadenia			X
501452	Chamaesyce polycarpa			X
527286	Chamaesyce polycarpa var. hirtella			X
28248	Chamaesyce serpens			X
501458	Chamaesyce serpyllifolia			X
510768	Chamomilla suaveolens		X	
506893	Chasmanthe floribunda		X	
17437	Cheilanthes clevelandii		X	
17438	Cheilanthes cooperae		X	X
17439	Cheilanthes covillei			X
501475	Cheilanthes newberryi			X
20592	Chenopodium album	X	X	
20590	Chenopodium ambrosioides		X	X
20594	Chenopodium berlandieri		X	X
20598	Chenopodium californicum	X	X	X
20619	Chenopodium macrospermum var. halophilum			X
20621	Chenopodium multifidum		X	X
20622	Chenopodium murale	X	X	X
20629	Chenopodium pumilio			X
523849	Chenopodium strictum ssp. glaucophyllum			X
41565	Chloris gayana			X
42899	Chlorogalum pomeridianum		X	
527336	Chlorogalum pomeridianum var. pomeridianum			X
527347	Chorizanthe fimbriata var. fimbriata	X		
21019	Chorizanthe orcuttiana	X		
527349	Chorizanthe parryi var. fernandina			X
527350	Chorizanthe parryi var. parryi			X

21023	Chorizanthe procumbens	X		
-2515	Chorizanthe procumbens var. procumbens	X		
21029	Chorizanthe staticoides	X	X	X
21035	Chorizanthe wheeleri		X	X
35796	Chrysanthemum coronarium	X	X	X
36763	Cichorium intybus		X	X
29620	Ciclospermum leptophyllum			X
36334	Cirsium	X		
36344	Cirsium brevistylum		X	
36391	Cirsium occidentale			X
531191	Cirsium occidentale var. californicum		X	X
527377	Cirsium occidentale var. occidentale		X	
531491	Cirsium occidentale var. venustum		X	
36392	Cirsium ochrocentrum		X	
36428	Cirsium vulgare		X	X
501559	Cistanthe maritima		X	X
501560	Cistanthe monandra		X	X
507742	Cistus creticus	X		
27587	Clarkia bottae			X
27591	Clarkia cylindrica			X
27594	Clarkia davyi		X	
27597	Clarkia epilobioides		X	X
27615	Clarkia prostrata		X	
27619	Clarkia purpurea ssp. quadrivulnera		X	X
27632	Clarkia unguiculata		X	X
525123	Claytonia exigua ssp. exigua			X
525126	Claytonia parviflora ssp. parviflora		X	
20395	Claytonia perfoliata			X
525130	Claytonia perfoliata ssp. mexicana		X	
20396	Claytonia perfoliata ssp. perfoliata	X	X	
18701	Clematis lasiantha		X	X
18702	Clematis ligusticifolia		X	X
18707	Clematis pauciflora	X	X	
22618	Cleome isomeris	X	X	X
28892	Cneoridium dumosum	X		
37103	Cnicus benedictus		X	X
33531	Collinsia heterophylla		X	X
33533	Collinsia parryi			X
523882	Comarostaphylis diversifolia ssp. planifolia		X	X
29473	Conium maculatum		X	X
30705	Convolvulus arvensis	X	X	X
30706	Convolvulus equitans		X	X
30708	Convolvulus simulans		X	
37112	Conyza bonariensis	X	X	X

37113	Conyza canadensis	X	X	X
37114	Conyza coulteri	X	X	
33565	Cordylanthus maritimus ssp. maritimus			X
33549	Cordylanthus rigidus ssp. rigidus			X
37126	Coreopsis bigelovii			X
37128	Coreopsis calliopsidea			X
37133	Coreopsis gigantea		X	X
37144	Coreopsis maritima	X		
533822	Corethrogyne filaginifolia var. incana	X		
27808	Cornus glabrata			X
23105	Coronopus didymus			X
41594	Cortaderia	X		
501640	Cortaderia jubata		X	X
41597	Cortaderia selloana		X	
35800	Cotula australis		X	X
35799	Cotula coronopifolia	X	X	X
501661	Crassula connata	X	X	X
30832	Cressa truxillensis	X	X	X
28265	Croton californicus	X		X
506920	Croton setigerus		X	X
501820	Crypsis vaginiflora			X
31794	Cryptantha clevelandii		X	X
31824	Cryptantha intermedia	X		X
31829	Cryptantha leiocarpa		X	
527563	Cryptantha maritima var. maritima		X	
31839	Cryptantha micromeres		X	X
31840	Cryptantha microstachys			X
31844	Cryptantha muricata		X	X
31881	Cryptantha traskiae		X	
22368	Cucurbita foetidissima		X	X
183478	Cupressus forbesii	X		
183480	Cupressus macrocarpa	X	X	
30720	Cuscuta californica	X	X	X
30723	Cuscuta ceanothi		X	X
30745	Cuscuta pentagona		X	
527603	Cuscuta pentagona var. pentagona			X
527606	Cuscuta salina var. major		X	X
511867	Cuscuta subinclusa		X	
507572	Cyclospermum leptophyllum			X
37221	Cynara cardunculus			X
37222	Cynara scolymus		X	
41619	Cynodon dactylon	X	X	X
39883	Cyperus acuminatus			X
39920	Cyperus eragrostis			X

39887	Cyperus erythrorhizos			X
39888	Cyperus esculentus			X
501929	Cyperus involucratus		X	X
39946	Cyperus niger			X
39894	Cyperus odoratus		X	X
39900	Cyperus rotundus			X
17482	Cystopteris fragilis		X	
193446	Dactylis glomerata			X
41628	Dactylus glomerata		X	
22336	Datisca glomerata			X
30520	Datura stramonium			X
30521	Datura wrightii		X	X
29478	Daucus pusillus	X	X	X
18546	Delphinium cardinale			X
18492	Delphinium parryi ssp. blochmaniae			X
523952	Delphinium parryi ssp. maritimum		X	
18491	Delphinium parryi ssp. parryi			X
18497	Delphinium patens ssp. hepaticoideum			X
501990	Dendromecon harfordii		X	
18938	Dendromecon rigida			X
18940	Dendromecon rigida ssp. harfordii		X	
22833	Descurainia pinnata ssp. menziesii	X	X	X
22843	Descurainia sophia	X		X
18951	Dicentra ochroleuca			X
502046	Dichelostemma capitatum		X	
524921	Dichelostemma capitatum ssp. capitatum	X		X
30838	Dichondra donnelliana		X	
30835	Dichondra occidentalis	X	X	X
33585	Digitalis purpurea		X	
40619	Digitaria ciliaris			X
40637	Digitaria ischaemum			X
40604	Digitaria sanguinalis	X		X
37246	Dimorphotheca sinuata	X		X
502080	Diplacus aurantiacus		X	
523972	Diplacus aurantiacus ssp. aurantiacus			X
502087	Diplacus longiflorus		X	X
502088	Diplacus parviflorus		X	
502090	Diplacus rutilus			X
502098	Diplotaxis tenuifolia			X
506664	Dipogon lignosus			X
40662	Distichlis spicata	X	X	X
23120	Dithyrea maritima		X	X
502107	Dodecatheon clevelandii			X
523974	Dodecatheon clevelandii ssp. clevelandii			X

523975	Dodecatheon clevelandii ssp. insulare		X	
523977	Dodecatheon clevelandii ssp. sanctarum			X
527760	Draba cuneifolia var. integrifolia		X	X
17521	Dryopteris arguta		X	X
524928	Dudleya abramsii ssp. parva			X
524013	Dudleya blochmaniae ssp. blochmaniae			X
524014	Dudleya blochmaniae ssp. insularis		X	
-2168	Dudleya caespitosa		X	
502167	Dudleya candelabrum		X	
-2169	Dudleya candelabrum X greenei		X	
502168	Dudleya cespitosa			X
502170	Dudleya cymosa			X
524019	Dudleya cymosa ssp. marcescens			X
524020	Dudleya cymosa ssp. ovatifolia			X
502172	Dudleya edulis	X		
-2170	Dudleya gnoma		X	
502174	Dudleya greenei		X	
-2171	Dudleya greenei X candelabrum		X	
195812	Dudleya lanceolata	X		X
502176	Dudleya multicaulis			X
502177	Dudleya nesiotica		X	
502179	Dudleya pulverulenta	X		
525084	Dudleya pulverulenta ssp. pulverulenta			X
195813	Dudleya traskiae		X	
502183	Dudleya verityi			X
40670	Echinochloa colona			X
502210	Echinochloa crus-galli			X
182443	Echinodorus berteroi			X
196226	Eclipta prostrata			X
41689	Ehrharta erecta		X	X
27770	Elaeagnus angustifolia	X		
21407	Elatine californica			X
40025	Eleocharis acicularis		X	
40051	Eleocharis macrostachya		X	
40057	Eleocharis montevidensis			X
40019	Eleocharis palustris			X
40063	Eleocharis parishii			X
40065	Eleocharis radicans			X
40022	Eleocharis rostellata			X
524031	Elymus glaucus ssp. glaucus		X	X
502271	Elymus multisetus			X
502280	Elymus stebbinsii			X
502282	Elymus trachycaulus			X

502293	Elytrigia repens		X	
21053	Emex spinosa			X
31362	Emmenanthe penduliflora			X
531378	Emmenanthe penduliflora var. penduliflora		X	
37307	Encelia californica	X	X	X
37308	Encelia farinosa			X
27288	Epilobium brachycarpum		X	X
524047	Epilobium canum ssp. angustifolium		X	
27290	Epilobium canum ssp. canum		X	X
525632	Epilobium canum ssp. mexicanum		X	
27294	Epilobium ciliatum ssp. ciliatum		X	X
507920	Epilobium pygmaeum			X
43481	Epipactis gigantea		X	X
17155	Equisetum ferrissi			X
527892	Equisetum hyemale var. affine		X	X
17156	Equisetum laevigatum		X	X
527893	Equisetum telmateia var. braunii		X	X
40772	Eragrostis barrelieri			X
40719	Eragrostis cilianensis			X
40721	Eragrostis hypnoides			X
40751	Eragrostis mexicana ssp. virescens			X
502347	Erechtites glomerata		X	
37321	Erechtites minima			X
21795	Eremalche exilis		X	
28317	Eremocarpus setigerus	X	X	
31052	Eriastrum densifolium ssp. elongatum			X
31063	Eriastrum filifolium		X	X
31068	Eriastrum sapphirinum			X
37323	Ericameria		X	
502362	Ericameria ericoides		X	X
37327	Ericameria linearifolia			X
531859	Ericameria nauseosa ssp. consimilis var. moha			X
527913	Ericameria palmeri var. pachylepis			X
502369	Ericameria parishii			X
502370	Ericameria pinifolia	X		
502387	Erigeron foliosus		X	
527940	Erigeron foliosus var. foliosus		X	X
535039	Erigeron foliosus var. stenophyllus		X	
35874	Erigeron glaucus		X	
35946	Erigeron sanctarum		X	
527981	Eriodictyon crassifolium var. crassifolium	X		X
21065	Eriogonum angulosum			X
21070	Eriogonum arborescens		X	

21092	Eriogonum cinereum		X	X
21093	Eriogonum cithariforme			X
21105	Eriogonum crocatum			X
21124	Eriogonum elongatum			X
195465	Eriogonum fasciculatum var. fasciculatum	X		X
527989	Eriogonum fasciculatum var. foliolosum			X
527992	Eriogonum giganteum var. compactum		X	
195473	Eriogonum giganteum var. giganteum		X	
195476	Eriogonum gracile var. gracile			X
195478	Eriogonum grande var. grande		X	
527994	Eriogonum grande var. rubescens		X	
21217	Eriogonum parvifolium			X
528027	Eriogonum wrightii var. membranaceum			X
531207	Eriophyllum confertiflorum var. confertifloru	X	X	X
37338	Eriophyllum nevinii		X	
37341	Eriophyllum staechadifolium		X	
29146	Erodium botrys	X	X	X
502424	Erodium brachycarpum		X	X
29147	Erodium cicutarium	X	X	X
29149	Erodium macrophyllum		X	X
29151	Erodium moschatum		X	X
22928	Erysimum ammophilum	X	X	
22932	Erysimum capitatum		X	X
22942	Erysimum insulare		X	
525071	Erysimum insulare ssp. suffrutescens			X
18955	Eschscholzia caespitosa			X
18956	Eschscholzia californica	X	X	X
18966	Eschscholzia ramosa		X	
502465	Eucalyptus camaldulensis	X	X	X
502473	Eucalyptus ficifolia	X		
27189	Eucalyptus globulus	X	X	X
502487	Eucalyptus sideroxylon		X	
27191	Eucalyptus tereticornis		X	
528102	Eucrypta chrysanthemifolia var. chrysanthemif	X	X	X
28058	Euphorbia crenulata			X
28064	Euphorbia esula			X
28104	Euphorbia misera	X	X	
28117	Euphorbia peplus	X	X	X
28138	Euphorbia spathulata			X
506980	Euphorbia terracina			X
37356	Euthamia occidentalis		X	X
-2516	Ferocactus viridescens var. viridescens	X		
40792	Festuca	X		
40810	Festuca arundinacea		X	

40813	Festuca elmeri			X
19093	Ficus carica		X	
37371	Filago arizonica		X	
37372	Filago californica	X	X	X
502620	Filago gallica		X	X
29509	Foeniculum vulgare	X	X	X
506985	Frangula californica		X	
524940	Frangula californica ssp. californica			X
524944	Frangula californica ssp. tomentella			X
22316	Frankenia palmeri	X		
502648	Frankenia salina		X	X
32932	Fraxinus dipetala			X
502664	Fraxinus uhdei			X
32936	Fraxinus velutina			X
502670	Fritillaria biflora			X
-2517	Fritillaria biflora var. biflora	X		
502706	Galenia pubescens			X
37414	Galinsoga parviflora			X
34814	Galium andrewsii ssp. intermedium			X
34816	Galium angustifolium ssp. angustifolium	X		X
34818	Galium angustifolium ssp. foliosum		X	X
34797	Galium aparine		X	X
34832	Galium buxifolium		X	
34835	Galium californicum ssp. flaccidum		X	
34838	Galium californicum ssp. miguelense		X	
34845	Galium cliftonsmithii			X
34900	Galium nuttallii ssp. insulare		X	
34899	Galium nuttallii ssp. nuttallii	X		X
34905	Galium parisiense			X
528215	Galium porrigens var. porrigens		X	
33599	Galvezia speciosa		X	
502720	Gambelia speciosa		X	
37421	Gamochaeta purpurea		X	
27838	Garrya veatchii		X	X
41746	Gastridium phleoides		X	X
41747	Gastridium ventricosum		X	X
27646	Gaura coccinea			X
27648	Gaura drummondii		X	
27661	Gaura sinuata			X
502735	Gazania linearis	X	X	
29104	Geranium	X		
29105	Geranium carolinianum		X	X
29135	Geranium dissectum		X	

29110	Geranium molle			X
29120	Geranium rotundifolium			X
31097	Gilia achilleifolia ssp. multicaulis		X	
31101	Gilia angelensis		X	X
31102	Gilia australis			X
31109	Gilia capitata ssp. abrotanifolia		X	X
31117	Gilia clivorum		X	
31087	Gilia nevinii		X	
31093	Gilia tenuiflora ssp. hoffmannii		X	
524108	Githopsis diffusa ssp. diffusa		X	X
26719	Glycyrrhiza lepidota			X
36698	Gnaphalium bicolor	X	X	
36699	Gnaphalium californicum	X	X	
525873	Gnaphalium canescens ssp. beneolens		X	
525874	Gnaphalium canescens ssp. microcephalum		X	
36706	Gnaphalium luteoalbum	X	X	
36709	Gnaphalium palustre		X	X
36695	Gnaphalium purpureum		X	
36711	Gnaphalium ramosissimum	X	X	
514144	Gnaphalium stramineum	X	X	
531050	Grindelia camporum var. bracteosa		X	
528273	Grindelia camporum var. camporum			X
531052	Grindelia hirsutula var. hirsutula		X	
531212	Grindelia stricta var. platyphylla		X	
507695	Guillenia lasiophylla		X	X
37481	Gutierrezia californica			X
502867	Hainardia cylindrica		X	
502881	Hazardia detonsa		X	
528325	Hazardia squarrosa var. grindelioides	X	X	X
528326	Hazardia squarrosa var. obtusa		X	
29393	Hedera helix	X		
37591	Hedypnois cretica	X		X
36020	Helenium puberulum			X
22265	Helianthemum greenei		X	
22270	Helianthemum scoparium	X	X	X
36616	Helianthus annuus		X	X
36643	Helianthus gracilentus			X
31635	Heliotropium curassavicum		X	X
525941	Heliotropium curassavicum ssp. oculatum	X		
37611	Hemizonia clementina		X	
37618	Hemizonia fasciculata	X	X	X
37619	Hemizonia fitchii		X	
524131	Hemizonia increscens ssp. increscens		X	

37628	Hemizonia minthornii			X
502946	Hemizonia pungens			X
502957	Herniaria hirsuta			X
524137	Herniaria hirsuta ssp. cinerea		X	X
507009	Hesperevax sparsiflora		X	
19162	Hesperocnide tenella	X	X	X
29245	Hesperolinon micranthum			X
25174	Heteromeles arbutifolia	X	X	X
37668	Heterotheca grandiflora	X	X	X
531882	Heterotheca sessiliflora ssp. fastigiata var. fastigiata			X
525048	Heterotheca sessiliflora ssp. sessiliflora			X
528399	Heterotheca villosa var. villosa			X
24359	Heuchera maxima		X	
21628	Hibiscus denudatus	X		
37695	Hieracium argutum		X	X
503045	Hirschfeldia incana	X	X	X
503051	Hoita macrostachya			X
25177	Holodiscus discolor		X	X
525119	Hordeum brachyantherum ssp. californicum		X	X
40868	Hordeum depressum		X	
503061	Hordeum intercedens		X	X
524158	Hordeum marinum ssp. gussonianum		X	X
524160	Hordeum murinum ssp. glaucum		X	X
524161	Hordeum murinum ssp. leporinum	X	X	X
40874	Hordeum vulgare		X	X
25188	Horkelia cuneata ssp. cuneata			X
503093	Hutchinsia procumbens		X	
182169	Hydrocotyle moschata			X
29514	Hydrocotyle umbellata			X
21431	Hypericum canariense	X		
37792	Hypochaeris glabra		X	X
37794	Hypochaeris radicata			X
30789	Ipomoea purpurea			X
43191	Iris		X	
43194	Iris pseudacorus			X
531066	Isocoma menziesii var. sedoides	X	X	X
531067	Isocoma menziesii var. vernonioides		X	X
503210	Isocoma veneta	X		
528570	Isocoma veneta var. veneta			X
507777	Isolepis cernua		X	
531331	Isolepis cernua var. californica			X
22646	Isomeris arborea	X	X	
36033	Iva axillaris			X
37167	Jaumea carnosa		X	X

24382	Jepsonia malvifolia		X	
24383	Jepsonia parryi	X		
530985	Juglans californica var. californica			X
503244	Juglans regia		X	
524958	Juncus acutus ssp. leopoldii			X
39223	Juncus balticus		X	X
39227	Juncus bufonius	X	X	
528601	Juncus bufonius var. bufonius			X
528602	Juncus bufonius var. congestus			X
528616	Juncus effusus var. pacificus		X	X
39288	Juncus macrophyllus			X
39294	Juncus mexicanus		X	X
39301	Juncus patens		X	X
528638	Juncus phaeocephalus var. paniculatus			X
528639	Juncus phaeocephalus var. phaeocephalus		X	
503262	Juncus rugulosus			X
39319	Juncus textilis			X
39320	Juncus torreyi			X
39329	Juncus xiphioides		X	X
194816	Juniperus californica			X
33615	Keckiella cordifolia		X	X
33625	Kickxia elatine			X
20696	Kochia scoparia			X
503284	Koeleria macrantha		X	X
515478	Koeleria phleoides		X	
36606	Lactuca saligna		X	
36608	Lactuca serriola		X	X
503306	Lactuca virosa			X
503308	Laennecia coulteri		X	X
524960	Lagophylla ramosissima ssp. ramosissima			X
41811	Lamarckia aurea	X	X	X
32539	Lamium amplexicaule		X	X
21291	Lastarriaea coriacea		X	X
503335	Lasthenia californica	X	X	X
37838	Lasthenia coronaria	X		X
37845	Lasthenia glabrata ssp. coulteri		X	X
25887	Lathyrus vestitus			X
524211	Lathyrus vestitus ssp. laetiflorus			X
25888	Lathyrus vestitus ssp. vestitus		X	
21816	Lavatera arborea			X
21817	Lavatera assurgentiflora			X
524213	Lavatera assurgentiflora ssp. assurgentiflora		X	
524214	Lavatera assurgentiflora ssp. glabra		X	

21818	Lavatera cretica		X	X
37863	Layia glandulosa		X	
37875	Layia platyglossa		X	X
42591	Lemna gibba			X
42590	Lemna minor		X	X
42595	Lemna trisulca			X
503362	Lemna turionifera			X
42596	Lemna valdiviana			X
32554	Lepechinia fragrans		X	X
22953	Lepidium	X		
22968	Lepidium lasiocarpum var. lasiocarpum		X	X
503379	Lepidium latifolium			X
531296	Lepidium latipes var. latipes		X	X
22971	Lepidium nitidum			X
528736	Lepidium nitidum var. nitidum		X	
531302	Lepidium oblongum var. insulare		X	
531303	Lepidium oblongum var. oblongum			X
22974	Lepidium perfoliatum			X
528740	Lepidium virginicum var. pubescens		X	X
528741	Lepidium virginicum var. robinsonii		X	
503385	Lepidospartum squamatum		X	X
41825	Leptochloa fascicularis			X
41820	Leptochloa uninervia			X
31230	Leptodactylon californicum			X
531221	Lessingia filaginifolia var. filaginifolia	X	X	X
-2500	Lessingia filaginifolia var. viscidula		X	
20490	Lewisia rediviva			X
503434	Leymus condensatus	X	X	X
503439	Leymus pacificus		X	
503443	Leymus triticoides		X	X
524240	Lilium humboldtii ssp. ocellatum		X	X
21332	Limonium californicum			X
21334	Limonium perezii			X
21336	Limonium sinuatum	X	X	
31279	Linanthus androsaceus		X	
31243	Linanthus bicolor		X	
31298	Linanthus dianthiflorus	X	X	X
31259	Linanthus liniflorus			X
508117	Linanthus parviflorus		X	X
31275	Linanthus pygmaeus ssp. continentalis			X
33211	Linaria canadensis	X	X	
503476	Linaria pinifolia			X
24389	Lithophragma affine			X

24394	Lithophragma cymbalaria		X	
531077	Lobelia dunnii var. serrata			X
23236	Lobularia maritima		X	X
524259	Loeflingia squarrosa ssp. squarrosa			X
507979	Lolium arundinaceum		X	X
40892	Lolium multiflorum		X	
40893	Lolium perenne		X	X
524260	Lolium perenne ssp. multiflorum		X	X
507983	Lolium pratense			X
40900	Lolium temulentum		X	X
29684	Lomatium caruifolium		X	
29693	Lomatium dasycarpum ssp. dasycarpum			X
29718	Lomatium lucidum	X		X
29756	Lomatium utriculatum		X	X
528895	Lonicera hispidula var. vacillans		X	X
35296	Lonicera interrupta		X	
35305	Lonicera subspicata	X	X	
528901	Lonicera subspicata var. denudata		X	X
-2516	Lotus argophyllus ssp. ornithopus		X	
528913	Lotus argophyllus var. argenteus		X	
26367	Lotus argophyllus var. argophyllus			X
528915	Lotus argophyllus var. niveus		X	
26362	Lotus corniculatus		X	X
195909	Lotus dendroideus var. dendroideus		X	
528921	Lotus dendroideus var. veatchii		X	
26380	Lotus grandiflorus			X
528922	Lotus grandiflorus var. grandiflorus		X	
26382	Lotus hamatus		X	X
26385	Lotus humistratus		X	
26390	Lotus micranthus		X	X
26393	Lotus nuttallianus	X		
528932	Lotus oblongifolius var. oblongifolius			X
26398	Lotus purshianus		X	
-2531	Lotus purshianus var. purshianus		X	
26402	Lotus salsuginosus			X
528936	Lotus salsuginosus var. salsuginosus		X	
26403	Lotus scoparius		X	X
528938	Lotus scoparius var. scoparius	X		
26405	Lotus strigosus	X	X	X
528945	Lotus unifoliolatus var. unifoliolatus		X	X
503563	Lotus wrangelianus		X	X
27356	Ludwigia peploides ssp. peploides		X	X
25928	Lupinus agardhianus		X	X

25930	Lupinus albifrons		X	
528951	Lupinus albifrons var. albifrons		X	
528953	Lupinus albifrons var. douglasii		X	
25940	Lupinus arboreus		X	
25966	Lupinus bicolor	X	X	X
25969	Lupinus bicolor ssp. microphyllus			X
524275	Lupinus bicolor ssp. tridentatus			X
25987	Lupinus chamissonis		X	X
25989	Lupinus concinnus		X	
528975	Lupinus densiflorus var. densiflorus		X	
528984	Lupinus formosus var. formosus			X
26027	Lupinus hirsutissimus		X	X
26040	Lupinus latifolius			X
26042	Lupinus latifolius ssp. dudleyi		X	
26053	Lupinus longifolius			X
503584	Lupinus luteus			X
516339	Lupinus microcarpus		X	
-2532	Lupinus microcarpus var. microcarpus		X	
26070	Lupinus nanus			X
26121	Lupinus sparsiflorus		X	X
26129	Lupinus subvexus			X
529008	Lupinus subvexus var. subvexus		X	X
26130	Lupinus succulentus	X	X	X
26136	Lupinus truncatus	X	X	X
503585	Lupinus versicolor		X	
39339	Luzula comosa		X	
30536	Lycium californicum	X	X	X
30541	Lycium fremontii		X	
30550	Lycium verrucosum		X	
30554	Lycopersicon esculentum		X	X
524289	Lyonothamnus floribundus ssp. aspleniifolius		X	
27082	Lythrum californicum		X	X
27085	Lythrum hyssopifolia			X
-2257	Lythrum hyssopifolium		X	
38025	Madia elegans ssp. densifolia			X
38028	Madia exigua		X	X
38030	Madia gracilis		X	X
38040	Madia sativa		X	
195042	Mahonia pinnata ssp. insularis		X	
195041	Mahonia pinnata ssp. pinnata			X
21827	Malacothamnus fasciculatus	X		X
537367	Malacothamnus fasciculatus var. nesioticus		X	
38045	Malacothrix clevelandii		X	X
38046	Malacothrix coulteri		X	

-2261	Malacothrix foliosa ssp. crispifolia		X	
524299	Malacothrix foliosa ssp. philbrickii		X	
38051	Malacothrix incana		X	
38052	Malacothrix indecora		X	
-2263	Malacothrix junakii		X	
529079	Malacothrix saxatilis var. implicata		X	
529081	Malacothrix saxatilis var. tenuifolia			X
38054	Malacothrix similis		X	
38056	Malacothrix squalida		X	
503669	Malephora crocea	X	X	X
503671	Malosma laurina	X		X
21836	Malva neglecta	X		
21837	Malva nicaeensis		X	X
21838	Malva parviflora	X	X	X
21846	Malvella leprosa		X	X
19779	Mammillaria dioica	X		
22391	Marah fabaceus		X	
529100	Marah macrocarpus var. macrocarpus	X		X
529101	Marah macrocarpus var. major		X	
32561	Marrubium vulgare	X	X	X
17998	Marsilea vestita			X
501470	Matricaria discoidea		X	X
23249	Matthiola incana			X
18979	Meconella denticulata		X	X
503721	Medicago lupulina			X
503725	Medicago polymorpha	X	X	X
183623	Medicago sativa		X	X
-2518	Melaleuca nesophila	X		
27228	Melaleuca quinquenervia	X		
41844	Melica californica			X
41853	Melica frutescens			X
41856	Melica imperfecta	X	X	X
26149	Melilotus alba	X		X
516979	Melilotus albus		X	
26152	Melilotus indica	X		X
503741	Melilotus indicus		X	
26150	Melilotus officinalis		X	
503750	Mentha canadensis			X
32270	Mentha pulegium			X
32272	Mentha spicata		X	X
503755	Mentzelia affinis		X	
503784	Mentzelia micrantha		X	X
503818	Mesembryanthemum crystallinum	X	X	X
503819	Mesembryanthemum nodiflorum	X	X	X

38097	Micropus californicus			X
529183	Micropus californicus var. californicus		X	
38104	Microseris douglasii ssp. douglasii			X
38105	Microseris douglasii ssp. platycarpha	X		X
38106	Microseris douglasii ssp. tenella		X	X
38107	Microseris elegans		X	X
33655	Mimetanthe pilosa			X
33283	Mimulus androsaceus			X
33287	Mimulus aurantiacus	X		
33297	Mimulus brandegei		X	
33247	Mimulus brevipes			X
33300	Mimulus cardinalis		X	X
33253	Mimulus flemingii		X	
33311	Mimulus floribundus		X	X
33236	Mimulus guttatus		X	X
33325	Mimulus longiflorus		X	
19991	Minuartia douglasii		X	X
19629	Mirabilis californica	X	X	X
21851	Modiola caroliniana			X
41878	Monanthochloe littoralis	X	X	X
32604	Monardella hypoleuca ssp. hypoleuca			X
32606	Monardella lanceolata			X
20700	Monolepis nuttalliana		X	
38119	Monolopia lanceolata			X
20404	Montia fontana		X	
507897	Morella californica			X
21293	Mucronea californica			X
41899	Muhlenbergia asperifolia			X
41888	Muhlenbergia microsperma	X	X	X
503883	Muhlenbergia rigens			X
34078	Myoporum laetum	X	X	
38996	Najas flexilis			X
31418	Nama stenocarpum			X
503931	Narcissus tazetta		X	
507080	Nassella cernua		X	X
507081	Nassella lepida	X	X	X
507084	Nassella pulchra	X	X	X
31324	Navarretia atractyloides		X	X
31329	Navarretia hamata			X
31330	Navarretia hamata ssp. hamata	X	X	
31317	Navarretia mellita			X
31319	Navarretia pubescens			X
529256	Nemacaulis denudata var. denudata	X		
34595	Nemacladus ramosissimus			X

31427	Nemophila menziesii			X
31429	Nemophila pedunculata		X	X
503942	Neogaerrhinum strictum		X	X
30573	Nicotiana clevelandii	X	X	X
30574	Nicotiana glauca	X	X	X
529279	Nicotiana quadrivalvis var. bigelovii			X
507567	Nolina cismontana			X
524336	Notholaena californica ssp. leucophylla			X
524341	Nuphar lutea ssp. polysepala			X
503969	Nuttallanthus canadensis		X	
503971	Nuttallanthus texanus			X
29563	Oenanthe sarmentosa			X
27379	Oenothera californica			X
524352	Oenothera elata ssp. hirsutissima		X	X
32990	Olea europaea		X	
504012	Oligomeris linifolia	X	X	X
195258	Opuntia basilaris var. basilaris			X
-2519	Opuntia californica var. californica	X		
19706	Opuntia ficus-indica		X	X
19717	Opuntia littoralis	X		
195283	Opuntia littoralis var. littoralis		X	X
19722	Opuntia oricola		X	X
195290	Opuntia parryi var. serpentina	X		
19727	Opuntia prolifera	X	X	X
34278	Orobanche bulbosa		X	X
34283	Orobanche californica ssp. grandis		X	X
34290	Orobanche fasciculata		X	X
524386	Orobanche parishii ssp. brachyloba	X	X	
34300	Orobanche uniflora		X	X
34304	Orobanche vallicola			X
29787	Osmorhiza brachypoda			X
504073	Osteospermum ecklonis	X		
-2484	Osteospermum fructicosum		X	X
-2534	Osteospermum fructicosum		X	
524391	Oxalis albicans ssp. californica		X	X
524392	Oxalis albicans ssp. pilosa		X	
29067	Oxalis corniculata	X	X	X
29092	Oxalis pes-caprae	X	X	X
29094	Oxalis rubra		X	X
18796	Paeonia californica			X
40914	Panicum capillare			X
40946	Panicum miliaceum			X
18888	Papaver californicum		X	X
18894	Papaver somniferum		X	

41069	Parapholis incurva	X	X	X
19166	Parietaria hespera			X
529372	Parietaria hespera var. californica	X	X	
529373	Parietaria hespera var. hespera			X
40997	Paspalum dilatatum			X
41005	Paspalum distichum		X	X
31972	Pectocarya linearis			X
526314	Pectocarya linearis ssp. ferocula		X	
504160	Pectocarya penicillata		X	X
33374	Pedicularis densiflora			X
29154	Pelargonium	X		
29159	Pelargonium X hortorum		X	
17640	Pellaea andromedifolia	X	X	X
504192	Pellaea mucronata			X
524435	Pellaea mucronata ssp. mucronata		X	
42007	Pennisetum americanum			X
42008	Pennisetum clandestinum		X	X
508150	Pennisetum glaucum			X
42013	Pennisetum setaceum	X		X
42006	Pennisetum villosum			X
33675	Penstemon centranthifolius			X
33922	Penstemon heterophyllus ssp. australis			X
33998	Penstemon spectabilis ssp. subviscosus			X
33969	Penstemon X parishii			X
504234	Pentachaeta lyonii			X
504236	Pentagrama triangularis	X		
524449	Pentagrama triangularis ssp. triangularis		X	X
524450	Pentagrama triangularis ssp. viscosa		X	
38211	Perityle emoryi	X	X	X
30585	Petunia parviflora		X	
31462	Phacelia brachyloba			X
529544	Phacelia cicutaria var. hispida		X	X
529545	Phacelia cicutaria var. hubbyi		X	
31485	Phacelia distans		X	X
31487	Phacelia douglasii			X
31488	Phacelia egena			X
31524	Phacelia grandiflora		X	X
31540	Phacelia imbricata ssp. imbricata			X
529562	Phacelia insularis var. insularis		X	
31515	Phacelia longipes			X
31548	Phacelia minor			X
31567	Phacelia parryi			X
531519	Phacelia ramosissima var. austrolitoralis		X	X

529575	Phacelia ramosissima var. latifolia			X
531520	Phacelia ramosissima var. montereyensis		X	
31602	Phacelia tanacetifolia			X
31449	Phacelia viscida		X	X
41334	Phalaris	X		
41341	Phalaris aquatica		X	X
41336	Phalaris canariensis			X
41343	Phalaris caroliniana		X	
41346	Phalaris lemmonii		X	
41337	Phalaris minor	X	X	X
41338	Phalaris paradoxa		X	X
41062	Phleum pratense	X		
504316	Phlox gracilis			X
524480	Phlox gracilis ssp. gracilis			X
504333	Phoenix canariensis	X		
31630	Pholisma arenarium	X		X
529615	Pholistoma auritum var. auritum		X	X
31613	Pholistoma membranaceum	X		
504336	Pholistoma racemosum	X	X	X
524517	Phoradendron macrophyllum ssp. macrophyllum			X
27875	Phoradendron villosum			X
41072	Phragmites australis			X
32196	Phyla lanceolata			X
32197	Phyla nodiflora			X
39071	Phyllospadix scouleri		X	X
39072	Phyllospadix torreyi		X	X
26861	Pickeringia montana var. montana		X	X
38247	Picris echioides		X	X
183359	Pinus muricata	X	X	
-2544	Pinus muricata f. muricata		X	
-2536	Pinus muricata f. remorata		X	
506604	Pinus pinea		X	
183372	Pinus radiata		X	
194796	Pinus thunbergiana	X		
183391	Pinus torreyana	X		
531176	Pinus torreyana var. insularis		X	
507927	Piperia cooperi	X		
43666	Piperia elegans	X		
504405	Piperia elongata		X	
519093	Piperia michaelii		X	
43668	Piperia unalascensis	X		X
504407	Piptatherum miliaceum		X	X
26867	Pisum sativum		X	

504426	Pittosporum crassifolium	X		
24067	Pittosporum tobira	X		
31986	Plagiobothrys acanthocarpus		X	X
31991	Plagiobothrys canescens		X	X
529689	Plagiobothrys collinus var. gracilis		X	
32011	Plagiobothrys nothofulvus			X
32021	Plagiobothrys tenellus			X
32877	Plantago elongata		X	
32880	Plantago erecta	X	X	X
32874	Plantago lanceolata		X	X
32887	Plantago major		X	X
529710	Plantago maritima var. californica		X	
504438	Plantago ovata		X	
504440	Plantago subnuda		X	
19022	Platanus racemosa	X	X	X
18983	Platystemon californicus		X	X
529725	Platystemon californicus var. californicus		X	
538958	Platystemon californicus var. ciliatus		X	
35378	Plectritis ciliosa ssp. insignis			X
196238	Pluchea carolinensis			X
36066	Pluchea odorata		X	
41107	Poa annua		X	X
41116	Poa bulbosa			X
41123	Poa douglasii		X	
508131	Poa howellii		X	X
41151	Poa palustris			X
41103	Poa secunda		X	X
-2537	Poa secunda ssp. secunda		X	
504490	Polycarpon depressum		X	X
504491	Polycarpon tetraphyllum		X	X
29328	Polygala californica		X	
529748	Polygala cornuta var. fishiae			X
529773	Polygonum amphibium var. emersum			X
20872	Polygonum arenastrum	X	X	X
20873	Polygonum argyrocoleon		X	X
20857	Polygonum hydropiperoides			X
20860	Polygonum lapathifolium		X	X
20862	Polygonum punctatum			X
17231	Polypodium californicum	X	X	X
17239	Polypodium scouleri		X	
41173	Polypogon elongatus			X
41174	Polypogon interruptus		X	X
41171	Polypogon monspeliensis	X	X	X
504522	Polypogon viridis		X	X

504530	Polystichum munitum		X	
22455	Populus balsamifera ssp. trichocarpa		X	X
22460	Populus fremontii ssp. fremontii		X	X
20422	Portulaca oleracea		X	X
39007	Potamogeton crispus			X
39010	Potamogeton pectinatus		X	X
24690	Potentilla anserina ssp. pacifica		X	
524577	Potentilla glandulosa ssp. glandulosa			X
504614	Proboscidea louisianica			X
24762	Prunus		X	
525142	Prunus ilicifolia ssp. ilicifolia	X		X
525143	Prunus ilicifolia ssp. lyonii		X	
24786	Prunus laurocerasus	X		
507647	Pseudognaphalium bicolor		X	X
507649	Pseudognaphalium californicum		X	X
525051	Pseudognaphalium canescens ssp. beneolens		X	X
525053	Pseudognaphalium canescens ssp. microcephalum		X	X
507654	Pseudognaphalium leucocephalum			X
507655	Pseudognaphalium luteoalbum		X	X
507659	Pseudognaphalium ramosissimum		X	X
508110	Pseudognaphalium stramineum		X	X
529898	Psilocarphus tenellus var. tenellus		X	X
529922	Pteridium aquilinum var. pubescens		X	X
21317	Pterostegia drymarioides	X	X	X
25291	Pyracantha		X	
195065	Quercus agrifolia var. agrifolia		X	X
507263	Quercus berberidifolia			X
19312	Quercus chrysolepis		X	
19322	Quercus douglasii		X	
19323	Quercus dumosa	X	X	
19329	Quercus engelmannii		X	
19366	Quercus kelloggii		X	
19370	Quercus lobata		X	X
507844	Quercus pacifica		X	
531373	Quercus parvula var. parvula		X	
-2539	Quercus parvula X kelloggii		X	
19435	Quercus tomentella		X	
529962	Quercus wislizeni var. frutescens			X
19372	Quercus X macdonaldii		X	
38330	Rafinesquia californica		X	X
18595	Ranunculus californicus		X	X
529964	Ranunculus cymbalaria var. saximontanus			X
18610	Ranunculus hebecarpus			X

18642	Ranunculus repens			X
23289	Raphanus raphanistrum		X	X
23290	Raphanus sativus	X	X	X
28566	Rhamnus californica ssp. californica		X	X
28574	Rhamnus crocea	X		X
28576	Rhamnus crocea ssp. ilicifolia			X
28581	Rhamnus pirifolia		X	
28783	Rhus integrifolia	X	X	X
28789	Rhus ovata	X	X	X
530010	Rhus trilobata var. pilosissima			X
530042	Ribes aureum var. gracillimum			X
530045	Ribes californicum var. hesperium			X
24472	Ribes indecorum			X
530058	Ribes malvaceum var. malvaceum		X	
530059	Ribes malvaceum var. viridifolium			X
24502	Ribes speciosum			X
508136	Ribes thacherianum		X	
28393	Ricinus communis	X	X	X
504804	Robinia pseudoacacia		X	
18987	Romneya coulteri			X
23001	Rorippa curvisiliqua			X
22993	Rorippa nasturtium-aquaticum		X	X
24818	Rosa californica		X	X
24838	Rosa pisocarpa	X		
504835	Rostraria cristata		X	
24852	Rubus discolor			X
25073	Rubus ursinus		X	X
20934	Rumex acetosella		X	X
20936	Rumex conglomeratus		X	X
20937	Rumex crispus		X	X
20963	Rumex kerneri			X
20965	Rumex maritimus		X	X
20942	Rumex pulcher		X	
530194	Rumex salicifolius var. crassus			X
530199	Rumex salicifolius var. salicifolius		X	X
504922	Rupertia physodes			X
39065	Ruppia cirrhosa			X
39063	Ruppia maritima		X	X
29001	Ruta chalepensis			X
20021	Sagina apetala		X	
20024	Sagina decumbens ssp. occidentalis		X	
504942	Sairocarpus coulterianus			X
504944	Sairocarpus multiflorus		X	X
504945	Sairocarpus nuttallianus		X	X

20649	Salicornia bigelovii			X
504951	Salicornia maritima			X
20652	Salicornia subterminalis	X	X	
20648	Salicornia virginica	X	X	X
22508	Salix bonplandiana		X	
22529	Salix exigua		X	X
22539	Salix gooddingii			X
507256	Salix hindsiana			X
507257	Salix laevigata		X	X
22551	Salix lasiolepis		X	X
524653	Salix lucida ssp. lasiandra		X	X
30621	Salpichroa origanifolia			X
20655	Salsola kali	X		
525004	Salsola kali ssp. tragus			X
520950	Salsola tragus	X	X	
32697	Salvia apiana			X
32703	Salvia brandegei		X	
32707	Salvia columbariae	X	X	X
32721	Salvia leucophylla		X	X
32724	Salvia mellifera	X	X	X
32744	Salvia spathacea			X
35323	Sambucus mexicana		X	
525079	Sambucus nigra ssp. canadensis		X	X
24037	Samolus parviflorus		X	
524659	Samolus valerandi ssp. parviflorus		X	X
25305	Sanguisorba minor ssp. muricata			X
29845	Sanicula	X		
29847	Sanicula arguta		X	X
29848	Sanicula bipinnata			X
29851	Sanicula crassicaulis			X
29854	Sanicula hoffmannii		X	
29863	Sanicula tuberosa			X
524661	Sarcostemma cynanchoides ssp. hartwegii			X
32305	Satureja douglasii		X	X
24257	Saxifraga californica		X	X
29865	Scandix pecten-veneris			X
28811	Schinus molle	X	X	X
42065	Schismus arabicus		X	X
42066	Schismus barbatus	X	X	X
531333	Schoenoplectus acutus var. occidentalis			X
508141	Schoenoplectus americanus			X
508142	Schoenoplectus californicus		X	X
508146	Schoenoplectus pungens		X	
40226	Scirpus americanus		X	

40244	Scirpus californicus		X	
540452	Scirpus cernuus var. californicus		X	
40234	Scirpus maritimus		X	
40235	Scirpus microcarpus			X
40275	Scirpus pungens		X	
20360	Scleranthus annuus		X	
524681	Scrophularia californica ssp. californica		X	X
32779	Scutellaria tuberosa		X	X
24169	Sedum spathulifolium			X
17073	Selaginella bigelovii		X	X
17075	Selaginella cinerascens	X		
17090	Selaginella pilifera			X
36097	Senecio aphanactis		X	X
36106	Senecio breweri			X
36107	Senecio californicus	X		X
530312	Senecio flaccidus var. douglasii		X	X
36156	Senecio mikanioides		X	X
36194	Senecio vulgaris	X	X	X
505191	Setaria parviflora			X
35237	Sherardia arvensis			X
23304	Sibara filifolia		X	
21877	Sidalcea malviflora		X	
21878	Sidalcea malviflora ssp. malviflora			X
20045	Silene antirrhina		X	X
20067	Silene gallica	X	X	X
20079	Silene laciniata ssp. major	X	X	X
20089	Silene multinervia		X	X
20140	Silene verecunda ssp. platyota			X
38413	Silybum marianum		X	X
28030	Simmondsia chinensis	X		
23310	Sinapis arvensis		X	X
23312	Sisymbrium altissimum			X
23314	Sisymbrium irio		X	X
23316	Sisymbrium officinale		X	X
23317	Sisymbrium orientale		X	X
43242	Sisyrinchium bellum		X	X
43340	Smilax	X		
30416	Solanum americanum		X	
30422	Solanum clokeyi		X	
30428	Solanum douglasii		X	X
30429	Solanum elaeagnifolium		X	X
30448	Solanum nigrum	X		
30449	Solanum parishii	X		

505268	Solanum physalifolium			X
505270	Solanum ptychanthum			X
30454	Solanum rostratum			X
505276	Solanum xanti	X	X	X
19172	Soleirolia soleirolii			X
36240	Solidago californica		X	X
38879	Soliva sessilis			X
38424	Sonchus asper	X	X	X
38427	Sonchus oleraceus	X	X	X
38428	Sonchus tenerrimus		X	
42111	Sorghum halepense			X
26967	Spartium junceum			X
20365	Spergula arvensis		X	X
-2541	Spergula arvensis ssp. arvensis		X	
20155	Spergularia bocconii		X	X
20158	Spergularia macrotheca	X		
530507	Spergularia macrotheca var. macrotheca		X	X
20152	Spergularia marina		X	
507251	Spergularia salina		X	X
531122	Spergularia salina var. salina			X
20162	Spergularia villosa	X	X	X
42140	Sporobolus indicus			X
32325	Stachys ajugoides		X	
531390	Stachys ajugoides var. rigida			X
32312	Stachys albens			X
32329	Stachys bullata		X	X
23329	Stanleya pinnata			X
507671	Stebbinoseris heterocarpa		X	X
20169	Stellaria media	X	X	X
20188	Stellaria nitens		X	X
42157	Stenotaphrum secundatum			X
38444	Stephanomeria cichoriacea		X	X
196300	Stephanomeria diegensis		X	X
524723	Stephanomeria exigua ssp. coronaria		X	X
196296	Stephanomeria virgata ssp. virgata		X	X
28411	Stillingia linearifolia		X	
38472	Stylocline gnaphalioides		X	X
18992	Stylomecon heterophylla		X	X
505402	Suaeda calceoliformis			X
505403	Suaeda esteroa	X		X
507442	Suaeda taxifolia		X	X
35335	Symphoricarpos mollis		X	X
22306	Tamarix aphylla		X	
22309	Tamarix parviflora		X	

22310	Tamarix ramosissima	X	X
36213	Taraxacum officinale	X	X
29877	Tauschia arguta		X
29879	Tauschia hartwegii		X
38495	Tetradymia comosa		X
19938	Tetragonia tetragonioides	X	X
531130	Thalictrum fendleri var. polycarpum		X
530660	Thelypteris puberula var. sonorensis		X
507250	Thysanocarpus conchuliferus	X	
23428	Thysanocarpus curvipes	X	X
23429	Thysanocarpus laciniatus	X	X
29896	Torilis nodosa	X	X
28819	Toxicodendron diversilobum	X	X
38568	Tragopogon porrifolius	X	X
29057	Tribulus terrestris		X
32365	Trichostema lanatum		X
32373	Trichostema lanceolatum		X
26209	Trifolium albopurpureum	X	X
26224	Trifolium barbigerum	X	
26234	Trifolium ciliolatum	X	X
26241	Trifolium depauperatum		X
541385	Trifolium depauperatum var. truncatum	X	
26252	Trifolium fucatum	X	X
530731	Trifolium gracilentum var. gracilentum	X	X
530732	Trifolium gracilentum var. palmeri	X	
26259	Trifolium hirtum		X
26262	Trifolium incarnatum		X
26283	Trifolium macraei	X	
26286	Trifolium microcephalum	X	X
26287	Trifolium microdon	X	
26299	Trifolium obtusiflorum		X
26303	Trifolium palmeri	X	
26206	Trifolium repens		X
26326	Trifolium variegatum	X	X
505585	Trifolium willdenowii	X	X
38991	Triglochin concinnum		X
34610	Triodanis biflora	X	
530742	Triodanis perfoliata var. biflora		X
43098	Triteleia hyacinthina	X	
42237	Triticum aestivum		X
505615	Tropaeolum majus	X	X
23433	Tropidocarpum gracile		X
42327	Typha domingensis	X	X

42326	Typha latifolia		X	X
-2452	Ulmus hollandica		X	
530762	Umbellularia californica var. californica			X
-2455	Uropappus lindleyi		X	
508121	Uropappus linearifolius			X
524787	Urtica dioica ssp. holosericea		X	X
19158	Urtica urens		X	X
23608	Vaccinium ovatum		X	
38591	Venegasia carpesioides		X	X
33389	Verbascum blattaria			X
33394	Verbascum thapsus		X	
530781	Verbena lasiostachys var. lasiostachys			X
531465	Verbena lasiostachys var. scabrida		X	X
38603	Verbesina encelioides ssp. exauriculata			X
-2465	Veronica anagallis-aquatica		X	X
33405	Veronica persica			X
26331	Vicia americana		X	
524800	Vicia americana ssp. americana			X
26333	Vicia benghalensis		X	
505683	Vicia hassei		X	
26348	Vicia ludoviciana		X	
524806	Vicia ludoviciana ssp. ludoviciana		X	X
-2545	Vicia ludoviciana var. ludoviciana		X	
26355	Vicia sativa		X	X
524809	Vicia sativa ssp. nigra		X	
524810	Vicia sativa ssp. sativa		X	
524812	Vicia villosa ssp. varia		X	X
524813	Vicia villosa ssp. villosa			X
38655	Viguiera laciniata	X		
30237	Vinca major		X	X
22132	Viola pedunculata	X	X	X
28617	Vitis girdiana			X
42261	Vulpia bromoides		X	X
530857	Vulpia microstachys var. ciliata			X
530858	Vulpia microstachys var. confusa			X
530859	Vulpia microstachys var. microstachys			X
530860	Vulpia microstachys var. pauciflora		X	X
42263	Vulpia myuros			X
541788	Vulpia myuros var. hirsuta		X	
-2520	Vulpia myuros var. myuros	X		
530862	Vulpia octoflora var. hirtella	X	X	X
530863	Vulpia octoflora var. octoflora			X
42514	Washingtonia filifera		X	

42609	Wolffiella lingulata			X
17750	Woodwardia fimbriata		X	X
38691	Xanthium spinosum	X	X	X
38692	Xanthium strumarium		X	X
23735	Xylococcus bicolor	X		
29903	Yabea microcarpa		X	X
505787	Yucca schidigera	X		
43124	Yucca whipplei			X
39068	Zannichellia palustris		X	X
42555	Zantedeschia aethiopica		X	
43161	Zigadenus fremontii	X	X	X
39074	Zostera marina		X	X
507243	Zostera pacifica		X	

A.2. NPSpecies – Animalia – Mammals

Appendix A.2. NPSpecies Report - Animalia - Mammals

TSN	ITIS Latin Name	Preferred Common Name	CABR	CHIS	SAMO
180006	Antrozous pallidus	Pallid Bat		X	X
180636	Arctocephalus townsendi	Guadalupe Fur Seal		X	
180538	Balaena glacialis	Northern Right Whale		X	
180524	Balaenoptera acutorostrata	Minke Whale		X	
180526	Balaenoptera borealis	Rorqual (Sei Whale)		X	
180528	Balaenoptera musculus	Blue Whale		X	
180527	Balaenoptera physalus	Finback Whale		X	
180577	Bassariscus astutus	Ringtail			X
180627	Callorhinus ursinus	Northern Fur Seal		X	
180599	Canis latrans	Coyote	X		X
552491	Chaetodipus californicus	California Pocket Mouse			X
552510	Chaetodipus fallax	San Diego Pocket Mouse	X		
180062	Choeronycteris mexicana	Mexican Long-tongued Bat	X		
180438	Delphinus delphis	Common Dolphin		X	
179921	Didelphis virginiana	Virginia Opossum			X
180233	Dipodomys agilis	Pacific Kangaroo Rat			X
202390	Enhydra lutris nereis	Sea Otter		X	
180008	Eptesicus fuscus	Big Brown Bat		X	X
180521	Eschrichtius robustus	Gray Whale	X	X	
180537	Eubalaena glacialis	Northern Right Whale		X	
180010	Euderma maculatum	Spotted Bat			X
180625	Eumetopias jubatus	Stellar Sea Lion		X	
180625	Eumetopias jubatus	Northern Sea Lion		X	

180080	Eumops perotis	Western Mastiff Bat	X	X	X
180457	Grampus griseus	Risso Dolphin		X	
180491	Kogia breviceps	Pygmy Sperm Whale		X	
180444	Lagenorhynchus obliquidens	Pacific White-sided Dolphin		X	
180014	Lasionycteris noctivagans	Silver-haired Bat	X	X	X
552512	Lasiurus blossevillii	Red Bat	X	X	
180016	Lasiurus borealis	Red Bat	X	X	X
180017	Lasiurus cinereus	Hoary Bat	X	X	X
180115	Lepus californicus	Black-tailed Jack Rabbit			X
180454	Lissodelphis borealis	Right Whale Dolphin		X	
180582	Lynx rufus	Bobcat	X		X
180071	Macrotus californicus	California Leaf-nosed Bat			X
180530	Megaptera novaeangliae	Humback Whale		X	
180562	Mephitis mephitis	Striped Skunk	X		X
180514	Mesoplodon stejnegeri	Pacific Beaked Whale		X	
180305	Microtus californicus	California Vole			X
-2496	Microtus californicus sanctidiegi	California Vole	X		
180672	Mirounga angustirostris	Northern Elephant Seal		X	
180366	Mus musculus	House Mouse	X		X
180556	Mustela frenata	Long-tailed Weasel			X
179991	Myotis californicus	California Myotis	X	X	X
179995	Myotis evotis	Long-eared Myotis		X	X
179999	Myotis leibii	Small-footed Myotis			X
180002	Myotis thysanodes	Fringed Myotis		X	X
179990	Myotis volans	Long-legged Myotis			X
180004	Myotis yumanensis	Yuma Myotis			X
180373	Neotoma fuscipes	Dusky-footed Woodrat	X		X
180374	Neotoma lepida	Desert Woodrat			X
-2511	Neotoma lepida intermedia	San Diego Desert Woodrat	X		
179973	Notiosorex crawfordi	Desert Shrew	X		X
180085	Nyctinomops femorosaccus	Pocketed Free-tailed Bat	X		X
180698	Odocoileus hemionus	Mule Deer			X
180469	Orcinus orca	Killer Whale		X	
180129	Oryctolagus cuniculus			X	
-2510	Perognathus longimembrus pacificus	Pacific Little Pocket Mouse	X		
180282	Peromyscus boylii	Brush Mouse	X		X
180283	Peromyscus californicus	California Mouse	X		X
180286	Peromyscus eremicus	Cactus Mouse	X		X
180276	Peromyscus maniculatus	Deer Mouse	X	X	X
-2490	Peromyscus maniculatus anacapa	Anacapa Island Deer Mouse		X	
-2489	Peromyscus maniculatus elusus			X	
-2491	Peromyscus maniculatus santacruzae	Santa Cruz Island Deer Mouse		X	
-2492	Peromyscus maniculatus santarosae	Santa Rosa Island Deer Mouse		X	
180291	Peromyscus truei	Pinon Mouse			X

180649	Phoca vitulina	Harbor Seal	X	X	
180473	Phocoena phocoena	Harbor Porpoise		X	
180480	Phocoenoides dalli	Dall's Porpoise		X	
180489	Physeter catodon	Sperm Whale		X	
180024	Pipistrellus hesperus	Western Pipistrelle			X
202345	Plecotus townsendii townsendii	Townsend's big-eared bat		X	X
180575	Procyon lotor	Raccoon	X		X
180463	Pseudorca crassidens	False Killer Whale		X	
552479	Puma concolor	Mountain Lion			X
180363	Rattus norvegicus	Norway Rat			X
180362	Rattus rattus	Black Rat		X	X
180343	Reithrodontomys megalotis	Western Harvest Mouse	X	X	X
179981	Scapanus latimanus	Broad-footed Mole			X
180176	Sciurus griseus	Western Gray Squirrel			X
180172	Sciurus niger	Fox Squirrel			X
179950	Sorex monticolus	Dusky Shrew	X		
179952	Sorex ornatus	Ornate Shrew			X
180148	Spermophilus beecheyi	California Ground Squirrel	X		X
180570	Spilogale putorius	Spotted Skunk			X
180417	Steno bredanensis	Rough-toothed Dolphin		X	
180122	Sylvilagus audubonii	Desert Cottontail	X		X
180123	Sylvilagus bachmani	Brush Rabbit			X
180088	Tadarida brasiliensis	Mexican Free-tailed Bat		X	X
180565	Taxidea taxus	Badger			X
180222	Thomomys bottae	Botta's Pocket Gopher			X
180427	Tursiops gillii	Pacific Bottlenose Dolphin		X	
180426	Tursiops truncatus	Pacific Bottlenose Dolphin		X	
180609	Urocyon cinereoargenteus	Gray Fox	X		X
180610	Urocyon littoralis	Channel Islands Gray Fox		X	
-2526	Urocyon littoralis littoralis	Santa Crux Island Fox		X	
-2525	Urocyon littoralis santacruzae	Santa Miguel Island Fox		X	
-2487	Urocyon littoralis santarosae	Santa Rosa Island Fox		X	
180604	Vulpes vulpes	Red Fox			X
180621	Zalophus californianus	California Sea Lion	X	X	

A.3. NPSpecies – Animalia – Birds

Appendix A.3. NPSpecies Report - Animalia - Birds

TSN	ITIS Latin Name	Preferred Common Name	CABR	CHIS	SAMO
175309	Accipiter cooperii	Cooper's Hawk	X	X	X
175300	Accipiter gentilis	Northern Goshawk		X	X

175304Accipiter striatus	Sharp-shinned Hawk	X	X	X
176612Actitis macularia	Spotted Sandpiper	X	X	X
554027Aechmophorus clarkii	Clark's Grebe	X	X	X
174503Aechmophorus occidentalis	Western Grebe	X	X	X
177942Aegolius acadicus	Northern Saw-whet Owl		X	
178014Aeronautes saxatalis	White-throated Swift	X	X	X
179045Agelaius phoeniceus	Red-winged Blackbird	X	X	X
179060Agelaius tricolor	Tricolored Blackbird	X	X	X
179377Aimophila ruficeps	Southern California Rufous-crowned Sparrow	X		X
179382Aimophila ruficeps obscura	Rufous-crowned Sparrow		X	
175122Aix sponsa	Wood Duck		X	X
174940Ajaia ajaja	Roseate Spoonbill			X
175908Alectoris chukar	Chukar		X	
554926Amazona oratrix	Yellow-headed Parrot			X
177806Amazona viridigenalis	Red-crowned Parrot			X
179339Ammodramus bairdii	Baird's Sparrow	X		
179345Ammodramus leconteii	Le Conte's Sparrow			X
554031Ammodramus nelsoni	Nelson's Sharp-tailed Sparrow			X
179333Ammodramus savannarum	Grasshopper Sparrow	X	X	X
179402Amphispiza belli	Sage Sparrow	X	X	X
179395Amphispiza bilineata	Black-throated Sparrow	X	X	X
175074Anas acuta	Northern Pintail	X	X	X
175094Anas americana	American Wigeon		X	X
175096Anas clypeata	Northern Shoveler	X	X	X
175081Anas crecca	Green-winged Teal	X	X	X
175089Anas cyanoptera	Cinnamon Teal	X	X	X
175086Anas discors	Blue-winged Teal	X	X	X
175092Anas penelope	Eurasian Wigeon		X	X
175063Anas platyrhynchos	Mallard	X	X	X
175073Anas strepera	Gadwall			X
175020Anser albifrons	Greater White-fronted Goose	X	X	X
178498Anthus cervinus	Red-throated Pipit	X	X	
554127Anthus rubescens	American Pipit	X	X	X
554128Aphelocoma californica	Western Scrub Jay	X		X
554129Aphelocoma insularis	Island Scrub Jay		X	
176673Aphriza virgata	Surfbird	X	X	X
175407Aquila chrysaetos	Golden Eagle	X	X	X
177686Aratinga mitrata	Mitred Parakeet			X
178033Archilochus alexandri	Black-chinned Hummingbird	X	X	X
174773Ardea herodias	Great Blue Heron	X	X	X
176571Arenaria interpres	Ruddy Turnstone	X	X	X
176574Arenaria melanocephala	Black Turnstone	X	X	X
177935Asio flammeus	Short-eared Owl	X	X	X
177932Asio otus	Long-eared Owl	X	X	X
177946Athene cunicularia	Burrowing Owl	X	X	X
175134Aythya affinis	Lesser Scaup	X	X	X
175125Aythya americana	Redhead		X	X
175128Aythya collaris	Ring-necked Duck		X	X

175135	Aythya fuligula	Tufted Duck		X
175130	Aythya marila	Greater Scaup	X	X
175129	Aythya valisineria	Canvasback	X	X
554140	Baeolophus inornatus	Oak Titmouse		X
176610	Bartramia longicauda	Upland Sandpiper	X	
178532	Bombycilla cedrorum	Cedar Waxwing	X	X X
178529	Bombycilla garrulus	Bohemian Waxwing		X
174856	Botaurus lentiginosus	American Bittern		X
177002	Brachyramphus hypoleuca scrippsi	Xantus's Murrelet	X	X
176996	Brachyramphus marmoratus	Marbled Murrelet	X	X X
175011	Branta bernicla	Brant	X	X X
174999	Branta canadensis	Canada Goose	X	X X
554910	Brotogeris chiriri	Yellow-chevroned Parakeet		X
177884	Bubo virginianus	Great Horned Owl	X	X X
174803	Bubulcus ibis	Cattle Egret	X	X X
175145	Bucephala albeola	Bufflehead	X	X X
175141	Bucephala clangula	Common Goldeneye	X	X X
175368	Buteo albonotatus	Zone-tailed Hawk	X	
175350	Buteo jamaicensis	Red-tailed Hawk	X	X X
175373	Buteo lagopus	Rough-legged Hawk	X	X X
175359	Buteo lineatus	Red-shouldered Hawk	X	X
175365	Buteo platypterus	Broad-winged Hawk	X	X
175377	Buteo regalis	Ferruginous Hawk	X	X
175367	Buteo swainsoni	Swainson's Hawk	X	X X
174793	Butorides virescens	Green Heron	X	X X
179312	Calamospiza melanocorys	Lark Bunting	X	X X
179526	Calcarius lapponicus	Lapland Longspur	X	X
179525	Calcarius mccownii	McCown's Longspur	X	
179530	Calcarius ornatus	Chestnut-collared Longspur	X	X
176669	Calidris alba	Sanderling	X	X X
176661	Calidris alpina	Dunlin	X	X X
176655	Calidris bairdii	Baird's Sandpiper	X	X X
176642	Calidris canutus	Red Knot	X	X X
554145	Calidris himantopus	Stilt Sandpiper	X	X
176668	Calidris mauri	Western Sandpiper	X	X X
176653	Calidris melanotos	Pectoral Sandpiper	X	X X
176656	Calidris minutilla	Least Sandpiper	X	X X
176667	Calidris pusilla	Semipalmated Sandpiper	X	X
175876	Callipepla californica	California Quail	X	X X
178036	Calypte anna	Anna's Hummingbird	X	X X
178035	Calypte costae	Costa's Hummingbird	X	X X
178588	Campylorhynchus brunneicapillus couesi	Western Coastal Cactus Wren		X
178587	Campylorhynchus brunneicapillus	Cactus Wren	X	
177961	Caprimulgus vociferus	Whip-poor-will	X	
178970	Cardellina rubrifrons	Red-faced Warbler	X	
179132	Cardinalis sinuatus	Pyrrhuloxia	X	

179232Carduelis lawrencei	Lawrence's Goldfinch	X	X	X
179233Carduelis pinus	Pine Siskin	X	X	X
179234Carduelis psaltria	Lesser Goldfinch	X	X	X
179236Carduelis tristis	American Goldfinch	X	X	X
179190Carpodacus cassinii	Cassin's Finch	X		
179191Carpodacus mexicanus	House Finch	X	X	X
179195Carpodacus mexicanus clementis	House Finch		X	
179192Carpodacus mexicanus frontalis	House Finch		X	
179186Carpodacus purpureus	Purple Finch	X	X	X
174810Casmerodius albus	Great Egret	X	X	X
176801Catharacta maccormicki	South Polar Skua		X	X
175265Cathartes aura	Turkey Vulture	X		X
179796Catharus fuscescens	Veery			X
179779Catharus guttatus	Hermit Thrush	X	X	X
179793Catharus minimus	Gray-cheeked Thrush	X		
179788Catharus ustulatus	Swainson's Thrush	X	X	X
178610Catherpes mexicanus	Canyon Wren		X	X
176638Catoptrophorus semipalmatus	Willet	X	X	X
176991Cepphus columba	Pigeon Guillemot		X	X
177023Cerorhinca monocerata	Rhinoceros Auklet	X	X	X
178803Certhia americana	Brown Creeper	X	X	X
178119Ceryle alcyon	Belted Kingfisher	X	X	X
178001Chaetura pelagica	Chimney Swift	X	X	X
178002Chaetura vauxi	Vaux's Swift	X	X	X
178826Chamaea fasciata	Wrentit	X		X
176510Charadrius alexandrinus	Snowy Plover	X	X	
176511Charadrius alexandrinus nivosus	Western Snowy Plover			X
176507Charadrius melodus	Piping Plover			X
176522Charadrius montanus	Mountain Plover		X	X
176506Charadrius semipalmatus	Semipalmated Plover	X	X	X
176520Charadrius vociferus	Killdeer	X	X	X
175038Chen caerulescens	Snow Goose	X	X	X
175041Chen rossii	Ross' Goose			X
176959Chlidonias niger	Black Tern	X		X
179371Chondestes grammacus	Lark Sparrow	X	X	X
177988Chordeiles acutipennis	Lesser Nighthawk	X	X	X
177979Chordeiles minor	Common Nighthawk		X	
178536Cinclus mexicanus	American Dipper		X	X
175430Circus cyaneus	Northern Harrier	X	X	X
178608Cistothorus palustris	Marsh Wren	X	X	X
178605Cistothorus platensis	Sedge Wren			X
175147Clangula hyemalis	Long-tailed Duck	X		X
179173Coccothraustes vespertinus	Evening Grosbeak	X		X
177831Coccyzus americanus	Yellow-billed Cuckoo		X	X
178154Colaptes auratus	Northern Flicker	X	X	X
177065Columba fasciata	Band-tailed Pigeon	X	X	X
177071Columba livia	Rock Dove	X	X	X

177152Columbina passerina	Common Ground Dove	X		X
178365Contopus borealis	Olive-sided Flycatcher		X	
554221Contopus cooperi	Olive-sided Flycatcher	X		X
178356Contopus pertinax	Greater Pewee	X		X
178360Contopus sordidulus	Western Wood-pewee	X	X	X
179731Corvus brachyrhynchos	American Crow	X	X	X
179725Corvus corax	Common Raven	X	X	X
179685Cyanocitta stelleri	Steller's Jay	X		X
178073Cynanthus latirostris	Broad-billed Hummingbird			X
177997Cypseloides niger	Black Swift	X	X	X
178888Dendroica caerulescens	Black-throated Blue Warbler	X	X	X
178912Dendroica castanea	Bay-breasted Warbler	X	X	X
178903Dendroica cerulea	Cerulean Warbler	X		
178891Dendroica coronata	Yellow-rumped Warbler	X	X	X
178918Dendroica discolor	Prairie Warbler	X	X	X
178905Dendroica dominica	Yellow-throated Warbler	X	X	
178904Dendroica fusca	Blackburnian Warbler	X	X	X
178909Dendroica graciae	Grace's Warbler	X	X	X
178886Dendroica magnolia	Magnolia Warbler	X	X	X
178896Dendroica nigrescens	Black-throated Gray Warbler	X	X	X
178902Dendroica occidentalis	Hermit Warbler	X	X	X
178921Dendroica palmarum	Palm Warbler	X	X	X
178911Dendroica pensylvanica	Chestnut-sided Warbler	X	X	X
178878Dendroica petechia	Yellow Warbler	X	X	X
178914Dendroica pinus	Pine Warbler	X		X
178913Dendroica striata	Blackpoll Warbler	X	X	X
178887Dendroica tigrina	Cape May Warbler	X	X	X
178897Dendroica townsendi	Townsend's Warbler	X	X	X
178898Dendroica virens	Black-throated Green Warbler	X	X	X
174517Diomedea immutabilis	Laysan Albatross		X	
174516Diomedea nigripes	Black-footed Albatross		X	
179032Dolichonyx oryzivorus	Bobolink	X	X	X
178166Dryocopus pileatus	Pileated Woodpecker			X
178625Dumetella carolinensis	Gray Catbird	X	X	X
174827Egretta caerulea	Little Blue Heron			X
174824Egretta rufescens	Reddish Egret			X
174813Egretta thula	Snowy Egret	X	X	X
174826Egretta tricolor	Tricolored Heron			X
175282Elanus leucurus	White-tailed Kite	X	X	X
179542Emberiza pusilla	Little Bunting	X		
178348Empidonax difficilis	Pacific-slope Flycatcher	X		X
178349Empidonax difficilis difficilis	Pacific-slope Flycatcher		X	
-2524 Empidonax difficilis insulicola	Pacific-slope Flycatcher		X	
554254Empidonax hammondii	Hammond's Flycatcher	X	X	X
178344Empidonax minimus	Least Flycatcher	X	X	X
178346Empidonax oberholseri	Dusky Flycatcher	X	X	X
178341Empidonax traillii	Willow Flycatcher	X	X	X
178347Empidonax wrightii	Gray Flycatcher	X	X	X

554256Eremophila alpestris	Horned Lark	X	X	
178417Eremophila alpestris actia	California Horned Lark			X
178415Eremophila alpestris insularis	Horned Lark		X	
174930Eudocimus albus	White Ibis	X		
179091Euphagus carolinus	Rusty Blackbird	X	X	X
179094Euphagus cyanocephalus	Brewer's Blackbird	X	X	X
175613Falco columbarius	Merlin	X	X	X
175603Falco mexicanus	Prairie Falcon	X	X	X
175604Falco peregrinus	Peregrine Falcon	X	X	X
175622Falco sparverius	American Kestrel	X	X	X
177032Fratercula cirrhata	Tufted Puffin		X	
177029Fratercula corniculata	Horned Puffin		X	
174763Fregata magnificens	Magnificent Frigatebird	X	X	X
176292Fulica americana	American Coot	X	X	X
174536Fulmarus glacialis	Northern Fulmar	X	X	X
176700Gallinago gallinago	Common Snipe		X	X
176284Gallinula chloropus	Common Moorhen			X
174470Gavia adamsii	Yellow-billed Loon			X
174469Gavia immer	Common Loon	X	X	X
174475Gavia pacifica	Pacific Loon	X	X	X
174474Gavia stellata	Red-throated Loon	X	X	X
177836Geococcyx californianus	Greater Roadrunner	X		X
178944Geothlypis trichas	Common Yellowthroat	X	X	X
176177Grus canadensis	Sandhill Crane			X
179145Guiraca caerulea	Blue Grosbeak	X	X	X
175274Gymnogyps californianus	California Condor			X
176475Haematopus bachmani	Black Oystercatcher	X	X	X
176472Haematopus palliatus	American Oystercatcher	X	X	
175420Haliaeetus leucocephalus	Bald Eagle	X	X	X
178850Helmitheros vermivorus	Worm-eating Warbler	X		X
176635Heteroscelus incanus	Wandering Tattler	X	X	X
176726Himantopus mexicanus	Black-necked Stilt	X	X	X
178448Hirundo rustica	Barn Swallow	X	X	X
175149Histrionicus histrionicus	Harlequin Duck		X	X
179777Hylocichla mustelina	Wood Thrush	X		
178964Icteria virens	Yellow-breasted Chat	X	X	X
554267Icterus bullockii	Bullock's Oriole	X	X	X
179070Icterus cucullatus	Hooded Oriole	X	X	X
179083Icterus galbula	Baltimore Oriole	X	X	X
179082Icterus parisorum	Scott's Oriole	X	X	X
179064Icterus spurius	Orchard Oriole	X		X
554268Ictinia mississippiensis	Mississippi Kite	X		
174846Ixobrychus exilis	Least Bittern			X
179410Junco hyemalis	Dark-eyed Junco	X	X	X
178515Lanius ludovicianus	Loggerhead Shrike	X	X	X
178521Lanius ludovicianus anthonyi	Loggerhead Shrike		X	
176824Larus argentatus	Herring Gull	X	X	X
176837Larus atricilla	Laughing Gull	X	X	X

176829Larus californicus	California Gull	X	X	X
176832Larus canus	Mew Gull	X	X	X
176830Larus delawarensis	Ring-billed Gull	X	X	X
176821Larus fuscus	Lesser Black-backed Gull			X
176814Larus glaucescens	Glaucous-winged Gull	X	X	X
176841Larus heermanni	Heermann's Gull	X	X	X
176808Larus hyperboreus	Glaucous Gull	X	X	X
176817Larus occidentalis	Western Gull	X	X	X
176839Larus philadelphia	Bonaparte's Gull	X	X	X
176838Larus pipixcan	Franklin's Gull		X	X
176865Larus sabini	Sabine's Gull			X
176828Larus thayeri	Thayer's Gull	X	X	X
176263Laterallus jamaicensis	Black Rail	X		
176675Limnodromus griseus	Short-billed Dowitcher	X	X	X
176679Limnodromus scolopaceus	Long-billed Dowitcher	X	X	X
176686Limosa fedoa	Marbled Godwit	X	X	X
175183Lophodytes cucullatus	Hooded Merganser		X	X
179259Loxia curvirostra	Red Crossbill	X	X	X
178189Melanerpes formicivorus	Acorn Woodpecker	X	X	X
178196Melanerpes lewis	Lewis' Woodpecker	X	X	X
175163Melanitta fusca	White-winged Scoter	X	X	X
175171Melanitta nigra	Black Scoter	X	X	X
175170Melanitta perspicillata	Surf Scoter	X	X	X
176136Meleagris gallopavo	Wild Turkey		X	
179488Melospiza georgiana	Swamp Sparrow	X	X	X
179484Melospiza lincolnii	Lincoln's Sparrow	X	X	X
179492Melospiza melodia	Song Sparrow	X	X	X
179518Melospiza melodia clementae	San Clemente Island Song Sparrow		X	
179519Melospiza melodia graminea	Santa Barbara Island Song Sparrow		X	
179517Melospiza melodia micronyx	San Miguel Island Song Sparrow		X	
175185Mergus merganser	Common Merganser	X		X
175187Mergus serrator	Red-breasted Merganser	X	X	X
178620Mimus polyglottos	Northern Mockingbird	X	X	X
178844Mniotilta varia	Black-and-white Warbler	X	X	X
179112Molothrus ater	Brown-headed Cowbird	X	X	X
178483Motacilla flava	Yellow Wagtail			X
179824Myadestes townsendi	Townsend's Solitaire	X	X	X
178316Myiarchus cinerascens	Ash-throated Flycatcher	X	X	X
178309Myiarchus crinitus	Great Crested Flycatcher	X		
178986Myioborus pictus	Painted Redstart	X	X	X
178305Myiodynastes luteiventris	Sulphur-bellied Flycatcher	X		X
177693Nandayus nenday	Black-hooded Parakeet			X
179750Nucifraga columbiana	Clark's Nutcracker	X	X	X
176593Numenius americanus	Long-billed Curlew	X	X	X
176599Numenius phaeopus	Whimbrel	X	X	X
174832Nycticorax nycticorax	Black-crowned Night-Heron	X	X	X
174625Oceanodroma furcata	Fork-tailed Storm-Petrel	X		
174634Oceanodroma homochroa	Ashy Storm-Petrel	X	X	

174628Oceanodroma leucorhoa	Leach's Storm-Petrel		X	
174640Oceanodroma melania	Black Storm-Petrel	X	X	
174646Oceanodroma microsoma	Least Storm-Petrel	X	X	
178938Oporornis agilis	Connecticut Warbler	X		X
178937Oporornis formosus	Kentucky Warbler	X	X	
178939Oporornis philadelphia	Mourning Warbler	X	X	
178940Oporornis tolmiei	Macgillivray's Warbler	X	X	X
175893Oreortyx pictus	Mountain Quail			X
178654Oreoscoptes montanus	Sage Thrasher	X	X	X
177878Otus flammeolus	Flammulated Owl	X	X	
555388Otus kennicottii	Western Screech-owl			X
175175Oxyura jamaicensis	Ruddy Duck	X	X	X
175590Pandion haliaetus	Osprey	X	X	X
178868Parula americana	Northern Parula	X	X	X
178718Parus gambeli	Mountain Chickadee	X		
178744Parus inornatus	Plain Titmouse	X		
179628Passer domesticus	House Sparrow	X	X	X
179314Passerculus sandwichensis	Savannah Sparrow	X	X	X
179325Passerculus sandwichensis beldingi	Belding's Savannah Sparrow			X
179330Passerculus sandwichensis rostratus	Large-billed Sparrow			X
179464Passerella iliaca	Fox Sparrow	X	X	X
179151Passerina amoena	Lazuli Bunting	X	X	X
179156Passerina ciris	Painted Bunting	X		
179150Passerina cyanea	Indigo Bunting	X	X	X
176113Pavo cristatus	Common Peafowl		X	X
174684Pelecanus erythrorhynchos	American White Pelican	X	X	X
174685Pelecanus occidentalis	Brown Pelican	X	X	X
178455Petrochelidon pyrrhonota	Cliff Swallow	X	X	X
174673Phaethon aethereus	Red-billed Tropicbird		X	
179877Phainopepla nitens	Phainopepla	X	X	X
174717Phalacrocorax auritus	Double-crested Cormorant	X	X	X
174725Phalacrocorax pelagicus	Pelagic Cormorant	X	X	X
174724Phalacrocorax penicillatus	Brandt's Cormorant	X	X	X
555544Phalaenoptilus nuttallii	Common Poorwill	X	X	X
554376Phalaropus fulicaria	Red Phalarope	X	X	X
176735Phalaropus lobatus	Red-necked Phalarope	X	X	X
176736Phalaropus tricolor	Wilson's Phalarope		X	X
175905Phasianus colchicus	Ring-necked Pheasant			X
179139Pheucticus ludovicianus	Rose-breasted Grosbeak	X	X	X
179140Pheucticus melanocephalus	Black-headed Grosbeak	X	X	X
176695Philomachus pugnax	Ruff			X
179723Pica nuttalli	Yellow-billed Magpie		X	
178258Picoides nuttallii	Nuttall's Woodpecker	X	X	X
178259Picoides pubescens	Downy Woodpecker	X		X
178262Picoides villosus	Hairy Woodpecker	X		X
179310Pipilo chlorurus	Green-tailed Towhee	X	X	X
202307Pipilo crissalis	California Towhee	X		X

554380	Pipilo maculatus	Spotted Towhee	X	X	X
-2522	Pipilo maculatus clementae	Spotted Towhee		X	
-2523	Pipilo maculatus megalonyx	Spotted Towhee		X	
179884	Piranga flava	Hepatic Tanager	X		
179882	Piranga ludoviciana	Western Tanager	X	X	X
179883	Piranga olivacea	Scarlet Tanager	X		X
179888	Piranga rubra	Summer Tanager	X	X	X
174926	Plegadis chihi	White-faced Ibis	X		X
176564	Pluvialis dominica	American Golden-plover	X	X	X
554381	Pluvialis fulva	Pacific Golden-plover			X
176567	Pluvialis squatarola	Black-bellied Plover	X	X	X
174482	Podiceps auritus	Horned Grebe	X	X	X
174479	Podiceps grisegena	Red-necked Grebe			X
174485	Podiceps nigricollis	Eared Grebe	X	X	X
174505	Podilymbus podiceps	Pied-billed Grebe	X	X	X
554385	Poecile gambeli	Mountain Chickadee			X
179853	Polioptila caerulea	Blue-gray Gnatcatcher	X	X	X
554389	Polioptila californica	California Gnatcatcher	X		X
179366	Pooecetes gramineus	Vesper Sparrow	X	X	X
176280	Porphyrula martinica	Purple Gallinule	X		
176242	Porzana carolina	Sora	X	X	X
178464	Progne subis	Purple Martin	X	X	X
178846	Protonotaria citrea	Prothonotary Warbler	X	X	X
178764	Psaltriparus minimus	Bushtit	X	X	X
177650	Psittacula krameri	Rose-ringed Parakeet			X
177013	Ptychoramphus aleuticus	Cassin's Auklet		X	X
174552	Puffinus bulleri	Buller's Shearwater	X		
174548	Puffinus carneipes	Flesh-footed Shearwater		X	
174547	Puffinus creatopus	Pink-footed Shearwater	X	X	
174553	Puffinus griseus	Sooty Shearwater	X	X	X
554396	Puffinus opisthomelas	Black-vented Shearwater	X	X	X
174554	Puffinus tenuirostris	Short-tailed Shearwater	X		X
178371	Pyrocephalus rubinus	Vermilion Flycatcher	X	X	X
179109	Quiscalus mexicanus	Great-tailed Grackle			X
176221	Rallus limicola	Virginia Rail		X	X
176211	Rallus longirostris levipes	Light-footed Clapper Rail			X
176721	Recurvirostra americana	American Avocet	X	X	X
179870	Regulus calendula	Ruby-crowned Kinglet	X	X	X
179865	Regulus satrapa	Golden-crowned Kinglet	X	X	X
178436	Riparia riparia	Bank Swallow	X	X	X
176875	Rissa tridactyla	Black-legged Kittiwake	X	X	X
554447	Rynchops niger	Black Skimmer	X		X
178614	Salpinctes obsoletus	Rock Wren	X	X	X
178330	Sayornis nigricans	Black Phoebe	X	X	X
178329	Sayornis phoebe	Eastern Phoebe	X	X	X
178333	Sayornis saya	Say's Phoebe	X	X	X
178927	Seiurus aurocapillus	Ovenbird	X	X	

178931Seiurus noveboracensis	Northern Waterthrush	X	X	X
178038Selasphorus platycercus	Broad-tailed Hummingbird	X		
178040Selasphorus rufus	Rufous Hummingbird	X	X	X
178041Selasphorus sasin	Allen's Hummingbird	X		X
178042Selasphorus sasin sasin	Allen's Hummingbird		X	
178043Selasphorus sasin sedentarius	Allen's Hummingbird		X	
178979Setophaga ruticilla	American Redstart	X	X	X
179811Sialia currucoides	Mountain Bluebird	X	X	X
179806Sialia mexicana	Western Bluebird	X	X	X
178784Sitta canadensis	Red-breasted Nuthatch	X	X	X
178775Sitta carolinensis	White-breasted Nuthatch	X	X	X
178788Sitta pygmaea	Pygmy Nuthatch	X		X
175160Somateria spectabilis	King Eider			X
178211Sphyrapicus nuchalis	Red-naped Sapsucker	X	X	X
178212Sphyrapicus ruber	Red-breasted Sapsucker	X	X	X
178208Sphyrapicus thyroideus	Williamson's Sapsucker			X
178202Sphyrapicus varius	Yellow-bellied Sapsucker	X	X	X
179165Spiza americana	Dickcissel	X	X	X
179432Spizella arborea	American Tree Sparrow	X	X	X
179448Spizella atrogularis	Black-chinned Sparrow	X	X	X
179440Spizella breweri	Brewer's Sparrow	X	X	X
179439Spizella pallida	Clay-colored Sparrow	X	X	X
179435Spizella passerina	Chipping Sparrow	X	X	X
178443Stelgidopteryx serripennis	Northern Rough-winged Swallow	X	X	X
178048Stellula calliope	Calliope Hummingbird	X	X	
176794Stercorarius longicaudus	Long-tailed Jaeger		X	
176793Stercorarius parasiticus	Parasitic Jaeger	X	X	X
176792Stercorarius pomarinus	Pomarine Jaeger	X	X	X
202254Sterna antillarum browni	California Least Tern	X		X
176924Sterna caspia	Caspian Tern	X	X	X
176925Sterna elegans	Elegant Tern	X	X	X
176887Sterna forsteri	Forster's Tern	X	X	X
176888Sterna hirundo	Common Tern	X		X
176922Sterna maxima	Royal Tern	X	X	X
176890Sterna paradisaea	Arctic Tern		X	X
177134Streptopelia chinensis	Spotted Dove	X	X	X
177136Streptopelia risoria	Ringed Turtle-dove		X	X
179039Sturnella neglecta	Western Meadowlark	X	X	X
179637Sturnus vulgaris	European Starling	X	X	X
174699Sula dactylatra	Masked Booby			X
174704Sula leucogaster	Brown Booby	X	X	
174702Sula nebouxii	Blue-footed Booby	X	X	
177008Synthliboramphus antiquus	Ancient Murrelet	X	X	X
177010Synthliboramphus craveri	Craveri's Murrelet		X	X
177011Synthliboramphus hypoleucus	Xantus' Murrelet		X	
178431Tachycineta bicolor	Tree Swallow	X	X	X
178427Tachycineta thalassina	Violet-green Swallow	X	X	X
178562Thryomanes bewickii	Bewick's Wren	X	X	X

178573Thryomanes bewickii nesophilus	Bewick's Wren		X	
178636Toxostoma bendirei	Bendire's Thrasher	X	X	X
178642Toxostoma redivivum	California Thrasher	X		X
178627Toxostoma rufum	Brown Thrasher	X	X	
176620Tringa flavipes	Lesser Yellowlegs		X	X
176619Tringa melanoleuca	Greater Yellowlegs	X	X	X
176615Tringa solitaria	Solitary Sandpiper	X	X	X
178541Troglodytes aedon	House Wren	X		X
178547Troglodytes troglodytes	Winter Wren	X		X
176684Tryngites subruficollis	Buff-breasted Sandpiper		X	
179759Turdus migratorius	American Robin	X	X	X
178292Tyrannus crassirostris	Thick-billed Kingbird	X		
178293Tyrannus forficatus	Scissor-tailed Flycatcher	X	X	
178282Tyrannus melancholicus	Tropical Kingbird	X		X
178279Tyrannus tyrannus	Eastern Kingbird	X	X	
178287Tyrannus verticalis	Western Kingbird	X	X	X
178288Tyrannus vociferans	Cassin's Kingbird	X	X	X
177851Tyto alba	Barn Owl	X	X	X
176974Uria aalge	Common Murre	X	X	X
178856Vermivora celata	Orange-crowned Warbler	X	X	X
178860Vermivora celata sordida	Orange-crowned Warbler		X	
178866Vermivora luciae	Lucy's Warbler	X	X	X
178855Vermivora peregrina	Tennessee Warbler	X	X	X
178853Vermivora pinus	Blue-winged Warbler	X		
178861Vermivora ruficapilla	Nashville Warbler	X	X	X
178864Vermivora virginiae	Virginia's Warbler	X	X	X
179003Vireo bellii	Bell's Vireo	X	X	
179007Vireo bellii pusillus	Least Bell's Vireo			X
554456Vireo cassinii	Cassin's Vireo	X	X	X
179009Vireo flavifrons	Yellow-throated Vireo	X		
179019Vireo flavoviridis	Yellow-green Vireo			X
179023Vireo gilvus	Warbling Vireo	X	X	X
178991Vireo griseus	White-eyed Vireo	X		X
178997Vireo huttoni	Hutton's Vireo	X	X	X
179021Vireo olivaceus	Red-eyed Vireo	X	X	X
179022Vireo philadelphicus	Philadelphia Vireo	X	X	X
554477Vireo plumbeus	Plumbeous Vireo	X	X	X
179008Vireo vicinior	Gray Vireo		X	
178977Wilsonia canadensis	Canada Warbler	X	X	X
178972Wilsonia citrina	Hooded Warbler	X	X	
178973Wilsonia pusilla	Wilson's Warbler	X	X	X
179043Xanthocephalus xanthocephalus	Yellow-headed Blackbird	X	X	X
176866Xema sabini	Sabine's Gull	X	X	
177121Zenaida asiatica	White-winged Dove	X	X	X
177125Zenaida macroura	Mourning Dove	X	X	X
179462Zonotrichia albicollis	White-throated Sparrow	X	X	X
179461Zonotrichia atricapilla	Golden-crowned Sparrow	X	X	X

179455Zonotrichia leucophrys	White-crowned Sparrow	X	X	X
179454Zonotrichia querula	Harris' Sparrow	X	X	X
563804Zoothera naevia	Varied Thrush	X	X	X

Appendix A.4. NPSpecies Report - Animalia - Reptiles and Amphibians

TSN	ITIS Latin Name	Preferred Common Name	CABR	CHIS	SAMO
173703	Aneides lugubris	Arboreal Salamander			X
174095	Anniella pulchra	Silvery Legless Lizard	X		X
209274	Arizona elegans occidentalis	California Glossy Snake	X		
563918	Arizona occidentalis	California Glossy Snake	X		
173704	Batrachoseps				X
173708	Batrachoseps nigriventris	California Slender Salamander		X	X
173709	Batrachoseps pacificus	Garden Slender Salamander	X	X	X
208342	Batrachoseps pacificus major	Pacific Slender Salamander	X		
207128	Bufo boreas halophilus	California Toad			X
550235	Bufo californicus	Arroyo Toad			X
173830	Caretta caretta	Loggerhead		X	
563949	Charina trivirgata roseofusca	Coastal Rosy Boa	X		
173833	Chelonia mydas	Green Sea Turtle, Green Turtle		X	
208594	Clemmys marmorata pallida	Southwestern Pond Turtle			X
174020	Cnemidophorus hyperythrus	Orange-Throated Whiptail	X		
208943	Cnemidophorus tigris multiscutatus	Coastal Whiptail			X
209197	Coluber constrictor mormon	Yellow-bellied Racer	X	X	
209198	Coluber mormon	Western Yellowbelly Racer	X	X	X
209532	Crotalus ruber ruber	Northern Pacific Rattlesnake	X		
209541	Crotalus viridis helleri	Southern Pacific Rattlesnake	X		X
173843	Dermochelys coriacea	Leatherback		X	
208672	Dermochelys coriacea schlegelii	Leatherback		X	
209172	Diadophis punctatus modestus	San Bernardino Ringneck Snake			X
209176	Diadophis punctatus similis	San Diego Ringneck Snake	X		
209020	Elgaria multicarinata	Southern Alligator Lizard		X	
209026	Elgaria multicarinata webbii	San Diego Alligator Lizard	X		X
208362	Ensatina eschscholtzii eschscholtzii	Monterey Ensatina			X
208906	Eumeces skiltonianus interparitalis	Coronado Island Skink	X		
208907	Eumeces skiltonianus skiltonia	Western Skink			X
174233	Hypsiglena torquata	Night Snake	X		
209304	Hypsiglena torquata klauberi	San Diego Night Snake			X
209310	Hypsiglena torquata ochrorhynca	Spotted Night Snake		X	
209248	Lampropeltis getula california	California Kingsnake	X		X

209264	Lampropeltis zonata pulchra	San Diego Mountain Kingsnake			X
209592	Leptotyphlops humilis humilis	Southwestern Blind Snake			X
209565	Lichanura trivirgata roseofusca	Coastal Rosy Boa	X		
174238	Masticophis flagellum	Coachwhip	X		
209325	Masticophis flagellum piceus	Red Coachwhip			X
209332	Masticophis lateralis laterali	California Striped Racer	X		X
173939	Phrynosoma coronatum	California Horned Lizard	X		X
209404	Pituophis catenifer annectens	San Diego Gopher Snake	X		X
563945	Pituophis melanoleucus annectens	San Diego Gopher Snake	X		
-2493	Pituophus catenifer pumilis	Santa Cruz Island Gopher Snake		X	
550237	Pseudacris cadaverina	California Treefrog			X
207313	Pseudacris regilla	Pacific Treefrog		X	X
173446	Rana aurora	Red-legged Frog		X	
207008	Rana aurora draytonii	California Red-legged Frog			X
173441	Rana catesbeiana	Bullfrog			X
173443	Rana pipiens	Northern Leopard Frog			X
174267	Rhinocheilus lecontei	Western Long-Nosed Snake	X		
209420	Salvadora hexalepis virgultea	Coast Patchnose Snake			X
173875	Sceloporus occidentalis	Western Fence Lizard	X		
208756	Sceloporus occidentalis becki	Island Fence Lizard		X	
208761	Sceloporus occidentalis longipes	Great Basin Fence Lizard			X
206990	Spea hammondii	Western Spadefoot			X
174285	Tantilla planiceps	Western Blackhead Snake			X
208226	Taricha torosa torosa	California Newt			X
209149	Thamnophis hammondii	Two-striped Garter Snake	X		X
209096	Thamnophis sirtalis infernalis	California Red-sided Garter Snake			X
173823	Trachemys scripta elegans	Red-eared Slider			X
209450	Trimorphodon biscutatus vandenburghi	California Lyre Snake			X
173956	Uta stansburiana	Side-Blotched Lizard	X	X	
208861	Uta stansburiana elegans	California Side-blotched Lizard			X
174091	Xantusia riversiana	Island Night Lizard		X	

A.5. NPSpecies – Animalia – Fish

Appendix A.5. NPSpecies Report - Animalia - Fish

TSN	ITIS Latin Name	Preferred Common Name	CABR	CHIS	SAMO
167426	Agonidae	poachers		X	
161121	Albula vulpes		X		
171465	Alloclinus holderi	island kelpfish	X	X	
159921	Alopias superciliosus			X	
159916	Alopias vulpinus			X	

164039	Ameiurus melas				X
169758	Amphistichus argenteus	barred surfperch		X	
169759	Amphistichus koelzi			X	
171345	Anarrhichthys ocellatus	wolf-eel	X	X	
161847	Anchoa compressa		X		
161848	Anchoa delicatissima		X		
169087	Anisotremus davidsoni	sargo	X	X	
171564	Anoplarchus purpurescens			X	
171635	Apodichthys fucorum	rockweed gunnel	X	X	
168211	Apogon guadalupensis			X	
167216	Artedius corallinus	coralline sculpin	X	X	
167423	Artedius creaseri	roughcheek sculpin		X	
167215	Artedius notospilotus	bonyhead sculpin		X	
165986	Atherinops affinis	topsmelt	X	X	X
166012	Atherinopsis californiensis		X		
169387	Atractoscion nobilis	white seabass	X	X	
166404	Aulorhynchus flavidus	tube-snout		X	
173140	Balistes polylepis		X	X	
169737	Brachyistius frenatus	kelp perch	X	X	
159684	Branchiostoma californiense		X		
164809	Brosmophycis marginata		X	X	
169204	Calamus brachysomus		X		
163350	Carassius auratus				X
160346	Carcharhinus brachyurus		X		
159903	Carcharodon carcharias			X	
168540	Caulolatilus princeps	ocean whitefish	X	X	
171618	Cebidichthys violaceus	monkeyface prickleback		X	
160089	Cephaloscyllium ventriosum	swell shark	X	X	
159907	Cetorhinus maximus			X	
171467	Chaenopsis alepidota	orangethroat pikeblenny		X	
169582	Chaetodon falcifer	scythe butterflyfish		X	
169358	Cheilotrema saturnum	black croaker	X	X	
165006	Chilara taylori	spotted cusk-eel	X	X	
171568	Chirolophis nugator	mosshead warbonnet		X	
167380	Chitonotus pugetensis		X	X	
170085	Chromis punctipinnis	blacksmith	X	X	
172727	Citharichthys fragilis			X	
172716	Citharichthys sordidus	Pacific sanddab	X	X	
172717	Citharichthys stigmaeus	speckled sanddab	X	X	
172726	Citharichthys xanthostigma			X	
171748	Clevelandia ios	arrow goby	X	X	X
167227	Clinocottus analis	woolly sculpin	X	X	
551209	Clupea pallasii		X		

165609	Cololabis saira			X	
171750	Coryphopterus nicholsi	Blackeye Goby	X	X	
166603	Cosmocampus arctus	snubnose pipefish		X	
171472	Cryptotrema corallinum			X	
169739	Cymatogaster aggregata	shiner perch	X	X	
169388	Cynoscion nobilis		X		
165440	Cypselurus californicus	California flyingfish	X	X	
173391	Diodon hystrix	spotted porcupinefish		X	
169745	Embiotoca jacksoni	black perch	X	X	
169744	Embiotoca lateralis	striped seaperch	X	X	
161828	Engraulis mordax	Northern anchovy	X	X	X
172868	Eopsetta jordani			X	
159757	Eptatretus stouti			X	
172977	Errex zachirus	rex sole		X	
171630	Esselenia carli		X		
171631	Esselenia laurae		X		
171916	Eucyclogobius newberryi			X	X
172405	Euthynnus lineatus		X		
165650	Fundulus parvipinnis				X
160181	Galeorhinus galeus		X		
160187	Galeorhinus zyopterus		X		
165878	Gambusia affinis				X
169257	Genyonemus lineatus		X		
171401	Gibbonsia elegans	spotted kelpfish	X	X	
171400	Gibbonsia erythra	scarlet kelpfish, crevice kelp		X	
171398	Gibbonsia metzi	striped kelpfish	X	X	
171399	Gibbonsia montereyensis	crevice kelpfish, scarlet kelp	X	X	X
553278	Gila orcuttii				X
171967	Gillichthys mirabilis		X		X
169515	Girella nigricans	opaleye	X	X	X
172978	Glyptocephalus zachirus	rex sole		X	
164461	Gobiesox eugrammus		X	X	
164459	Gobiesox maeandricus	northern clingfish		X	
164464	Gobiesox rhessodon	California clingfish	X	X	
161194	Gymnothorax mordax	California moray	X	X	
160963	Gymnura marmorata		X		
170511	Halichoeres semicinctus	rock wrasse	X	X	
167283	Hemilepidotus spinosus	brown Irish lord		X	
169520	Hermosilla azurea	zebra perch	X	X	
159791	Heterodontus francisci	horn shark	X	X	
171476	Heterostichus rostratus	giant kelpfish	X	X	
167110	Hexagrammos decagrammus	kelp greenling		X	
172784	Hippoglossina stomata	bigmouth sole		X	

161015	Hydrolagus colliei		X	X	
169747	Hyperprosopon argenteum	walleye surfperch	X	X	
169748	Hyperprosopon ellipticum			X	
171158	Hypsoblennius gentilis	bay blenny	X	X	
171159	Hypsoblennius gilberti	rockpool blenny	X	X	
171160	Hypsoblennius jenkinsi	mussel blenny	X	X	
172945	Hypsopsetta guttulata		X	X	X
169761	Hypsurus caryi	rainbow seaperch	X	X	
170120	Hypsypops rubicundus	garibaldi	X	X	
167296	Icelinus cavifrons		X		
167298	Icelinus quadriseriatus		X		
167294	Icelinus tenuis		X	X	
172510	Icichthys lockingtoni			X	
171892	Ilypnus gilberti	cheekspot goby	X	X	
159924	Isurus oxyrinchus			X	
171063	Kathetostoma averruncus		X	X	
159713	Lampetra tridentata				X
167386	Leiocottus hirundo	lavender sculpin	X	X	
171762	Lepidogobius lepidus			X	
168132	Lepomis cyanellus				X
168141	Lepomis macrochirus				X
167302	Leptocottus armatus	Pacific staghorn sculpin	X		X
171894	Lethops connectens	kelp gobi		X	X
166014	Leuresthes tenuis	California grunion	X	X	X
167570	Liparis mucosus		X	X	
171899	Lythrypnus dalli	bluebanded goby		X	
171903	Lythrypnus zebra	zebra goby		X	
169522	Medialuna californiensis	halfmoon	X	X	
169280	Menticirrhus undulatus		X		
169765	Micrometrus aurora	reef perch		X	
169766	Micrometrus minimus	dwarf perch	X	X	
168160	Micropterus salmoides				X
172887	Microstomus pacificus			X	
173414	Mola mola	ocean sunfish		X	
170335	Mugil cephalus		X		X
160235	Mustelus californicus	gray smoothhound	X	X	
160236	Mustelus henlei	brown smoothhound		X	
160981	Myliobatis californica	bat ray	X	X	
171478	Neoclinus blanchardi	sarcastic fringehead	X	X	
171479	Neoclinus stephensae	yellowfin fringehead		X	
171480	Neoclinus uninotatus	onespot fringehead		X	
167460	Odontopyxis trispinosa		X		
167336	Oligocottus rubellio		X		

167335	Oligocottus snyderi	tidepool sculpin		X	
161989	Oncorhynchus mykiss	steelhead trout			X
167116	Ophiodon elongatus	lingcod		X	
161751	Opisthonema medirastre		X		
167388	Orthonopias triacis	snubnose sculpin	X	X	
173256	Ostracion diaphanum			X	
170597	Oxyjulis californica	senorita	X	X	
167118	Oxylebius pictus	painted greenling	X	X	
171432	Paraclinus integripinnis	reef finspot	X	X	
167832	Paralabrax clathratus	kelp bass	X	X	
167833	Paralabrax maculatofasciatus	spotted sand bass	X	X	
167834	Paralabrax nebulifer	barred sand bass	X	X	
172743	Paralichthys californicus	California halibut	X	X	X
551113	Paranthias colonus		X		
172921	Parophrys vetulus	English sole	X	X	
172565	Peprilus simillimus		X		
169752	Phanerodon atripes	sharpnose seaperch	X	X	
169751	Phanerodon furcatus	white seaperch	X	X	
171637	Pholis	gunnels		X	
172893	Platichthys stellatus	starry flounder		X	X
160824	Platyrhinoidis triseriata	thornback	X	X	
172920	Pleuronectes vetulus	English sole	X	X	
172923	Pleuronichthys coenosus	c-o sole	X	X	
172924	Pleuronichthys decurrens	curlfin turbot		X	
172925	Pleuronichthys ritteri	spotted turbot	X	X	
172926	Pleuronichthys verticalis		X	X	
164420	Porichthys myriaster		X	X	
164414	Porichthys notatus		X	X	
160424	Prionace glauca	blue shark		X	
171910	Quietula y-cauda	shadow goby	X	X	
160848	Raja binoculata			X	
160849	Raja inornata			X	
160851	Raja rhina		X		
160854	Raja stellulata			X	
170953	Rathbunella alleni		X		
170954	Rathbunella hypoplecta	stripedfin ronquil		X	
169755	Rhacochilus toxotes	rubberlip seaperch	X	X	
169754	Rhacochilus vacca	pile perch	X	X	
160818	Rhinobatos productus	shovelnose guitarfish	X	X	
164467	Rimicola eigenmanni		X		
164466	Rimicola muscarum	kelp clingfish	X	X	
167422	Ruscarius creaseri	roughcheek sculpin	X	X	
161997	Salmo trutta				X

172408	Sarda chiliensis	Pacific bonito	X	X	
161729	Sardinops sagax		X	X	
172412	Scomber japonicus	chub mackerel	X	X	
166827	Scorpaena guttata	California scorpionfish	X	X	
167353	Scorpaenichthys marmoratus	cabezon	X	X	
166747	Sebastes atrovirens	kelp rockfish	X	X	
166708	Sebastes auriculatus		X	X	
166767	Sebastes carnatus	gopher rockfish	X	X	
166713	Sebastes caurinus	copper rockfish		X	
166748	Sebastes chlorostictus	greenspotted rockfish		X	
166773	Sebastes chrysomelas	black-and-yellow rockfish	X	X	
166749	Sebastes constellatus	starry rockfish		X	
166750	Sebastes dalli	calico rockfish	X	X	
166716	Sebastes diploproa			X	
166719	Sebastes entomelas			X	
166720	Sebastes flavidus			X	
166722	Sebastes goodei			X	
166753	Sebastes hopkinsi		X	X	
166725	Sebastes jordani		X	X	
166754	Sebastes levis			X	
166727	Sebastes melanops	black rockfish		X	
166729	Sebastes miniatus	vermilion rockfish	X	X	
166730	Sebastes mystinus	blue rockfish	X	X	
166731	Sebastes nebulosus			X	
166757	Sebastes ovalis		X		
166733	Sebastes paucispinis	bocaccio		X	
166734	Sebastes pinniger			X	
166759	Sebastes rastrelliger	grass rockfish	X	X	
166738	Sebastes rosaceus	rosy rockfish		X	
166760	Sebastes rubrivinctus		X	X	
166741	Sebastes saxicola		X		
166762	Sebastes semicinctus			X	
166763	Sebastes serranoides	olive rockfish	X	X	
166764	Sebastes serriceps	treefish	X	X	
166765	Sebastes umbrosus		X		
170744	Semicossyphus pulcher	California sheephead	X	X	
168695	Seriola lalandi	yellowtail	X	X	
169362	Seriphus politus	queenfish	X	X	X
170426	Sphyraena argentea	Pacific barracuda	X	X	
160617	Squalus acanthias		X	X	
160620	Squalus suckleyi		X		
160785	Squatina californica	Pacific angel shark	X	X	
167918	Stereolepis gigas	giant sea bass	X	X	

171554	Stichaeidae	pricklebacks		X	
173077	Symphurus atricauda	California tonguefish	X	X	
166604	Syngnathus arctus	snubnose pipefish		X	
166456	Syngnathus auliscus			X	
166457	Syngnathus californiensis	kelp pipefish	X	X	
166462	Syngnathus leptorhynchus	bay pipefish	X	X	X
162378	Synodus lucioceps			X	
172504	Tetrapturus audax	striped marlin		X	
160833	Torpedo californica	Pacific electric ray		X	
168586	Trachurus symmetricus	jack mackerel	X	X	
160448	Triakis semifasciata	leopard shark	X	X	
171914	Typhlogobius californiensis	blind goby	X	X	
171648	Ulvicola sanctaerosae	kelp gunnel	X	X	
169303	Umbrina roncador	yellowfin croaker	X	X	
160966	Urolophus halleri	round stingray	X	X	
169118	Xenistius californiensis	salema	X	X	
171636	Xererpes fucorum	rockweed gunnel	X	X	
172482	Xiphias gladius			X	
171598	Xiphister atropurpureus			X	
172800	Xystreurys liolepis	fantail sole	X	X	
160826	Zapteryx exasperata	banded guitarfish	X	X	

Appendix B: GIS Data Lists

B.1. Cabrillo National Monument – GIS data list

Appendix B.1. Cabrillo National Monument - GIS data list.

File	Description
DRG	
ptloma.*	USGS **DRG** for Point Loma
AERIAL PHOTOS	
ptloma27.tif	Aerial photo, taken October, 1998, orthocorrected to St. Pl. NAD 27, 1 m pixels, full color.
North.lan	Aerial photo, taken 1996, ortho corrected to UTM NAD83 Zone 11. North San Diego bay color including all of Pt Loma and N. Island to Coronado Bay bridge. From US Navy.

South.lan	Aerial photo, taken 1996, orthocorrected to UTM NAD82 Zone 11. South San Diego bay color image including rest of SD bay, overlapping at Coronado Bay bridge. From US Navy.

DEM

dem	DEM of most of Pt Loma plus North Island, Loma Portal, etc., from UC Riverside? NOT in State Plane.
wdem	DEM of western edge of Pt Loma, from UC Riverside? NOT in State Plane.

ARC VIEW SHAPEFILES (all State Plane Zone 6 NAD27)

BOUNDARIES AND TOPOGRAPHY

erosion ctrl sites	Erosion control sites digitized from US Navy hard copy map (Appn A)
jur cabrnavy	where CABR and Navy jurisdictions meet
jurcabr	CABR terrestrial jursidiction
jurcity	City of San Diego jurisdiction
jurnavy	US Navy jurisdiction
juruscg	USCG terrestrial jurisdiction
jurvets	US Veterans Administration jurisdiction
offshore jur bnd	Offshore boundary for CABR digitized from US Navy hard copy map (Appn A)
pleradon	Proposed additions to the Point Loma Ecological Reserve
shoreline	CABR shoreline jurisdiction

EXOTIC VEGETATION

carpobrotus	*Carpobrotus* spp. (exotic plant, aka "ice plant", "Hottentot fig") digitized from US Navy hard copy map (Appn A)
centaurea	*Centaurea sp*. (*C. melitensis*, "Tocalote thistle", possibly some *C. solstitialis*, "Yellow star-thistle") digitized from US Navy hard copy map (Appn A)
eucalyptus	*Eucalyptus* (exotic plant) digitized from US Navy hard copy map (Appn A)
erosion ctrl sites	Erosion control sites digitized from US Navy hard copy map (Appn A)
foeniculum	*Foeniculum vulgare* (exotic plant, aka "fennel"), digitized from US Navy hard copy map (Appn A)
hypericum	*Hypericum*, (exotic plant, "a St. Johns wort") digitized from US Navy hard copy map (Appn A)
myoporum	Myoporum laetum (exotic plant, aka "myoporum") digitized from US Navy hard copy map (Appn A)

nicotiana	*Nicotiana* (exotic plant, aka "tree tobacco") digitized from US Navy hard copy map (Appn A)
ricinus	*Ricinus* (exotic plant, aka "castor bean") digitized from US Navy hard copy map (Appn A)
Re-veg_photopnts	Locations of re-vegetation study photo points, CABR
wed rem	Digitized from US Navy hard copy map (Appn A)
worksites 96	Youth Conservation Corps work sites 1996, GPS'd
worksites 97	Youth Conservation Corps work sites 1997, GPS'd
worksites 98	Youth Conservation Corps work sites 1998, GPS'd
worksites 99	Youth Conservation Corps work sites 1999, GPS'd

RESEARCH STUDIES

Ucrbrdmml	Study locations for UC Riverside 1990's NCCP study of small mammals and birds of Point Loma, CABR data only
Pit-fall	Pit-fall trap locations for Dr. Robert Fisher's NCCP study of herps (UC San Diego, now USGS), CABR sites only (incomplete)

CULTURAL RESOURCES

Archsite	Potential archaelogical sites, CABR, as per US Navy, 1999
Artifact	Potential archaeological artifacts, CABR, as per US Navy, 1999
Hsrstrct	Historic structures at CABR for Historic Structures Report
Otherartf	Potential archaeological artifacts, "other" category, CABR, by US Navy, 1999

ARCINFO COVERAGES (all State Plane Zone 6, NAD27)

INFRASTRUCTURE

BODGPOLY	Building polygons
ROADS	Road outlines

BOUNDARIES AND TOPOGRAPHY

BACKPOLY	Background polygons used for shading large area surrounding Point Loma study area
BOUND	Point Loma study area boundary
BOUND3	Point Loma study area broken into three segments
CONTELE	Contour elevation at 2-foot intervals
CONTOURS	Contour lines for the preparation of field survey maps
GRID500	500-foot grid of Point Loma study area
JUR	Jurisdictions for Point Loma including different Naval Command Division
ROCKS	Offshore rocks

SLOPE	Percent slope
SLOPE20	Greater or less than 20% slope
SOILS	Soils map, Point Loma study area
SPOTELE	Spot elevations

MODELS AND PLANS

BIOPRES	Biologically preferred preserve alternative developed by Ogden biologists based on habitat evaluation
DEVLINE	Linear development plans
DEVPOLY	Development plans, Point Loma study area
FINALMOD	Final habitat evaluation model
PRESERVE	Approved preserve alternative developed by Ogden biologists with modifications previded by the Navy
RESTORE	Areas of potential restoration as identified by Ogden biologists

SENSITIVE VEGETATION (most 1999 shape files created by CABR… project in progress)

ADCA	Existing populations of Adolphia california, 1993
AGSH	Existing populations of Agave shawii, 1993
BEEM	Existing populations of Bergercactus emoryl, 1993
CEVE	Existing populations of Ceanothus verrucosus, 1993
COFI	Existing populations of Corethrogyne filanginifolia var. incana, 1993
COMA	Existing populations of Coreopsis maritima, 1993
EELGRASS	Eelgrass data along Point Loma shoreline
EUMI	Existing populations of Euphorbia misera, 1993
FEVI	Existing populations of Ferocactus viridescens, 1993
OPPAS	Existing populations of Opuntia parryl var. serpentina, 1993
PICO	Existing populations of Piperia cooperi, 1993
PITO	Existing populations of Pinus torreyana, 1993
QUDU	Existing populations of Quercus dumosa, 1993
SECI	Existing populations of Selaginella cinerascens, 1993
SPPNTS	Sensitive plant point location data for Point Loma, updated 1993
VEG	Vegetation communities at Point Loma, 1993
VILA	Existing populations of Viguiera laciniata, 1993

ANIMALS

SAPNTS	Sensitive animal point location data for Point Loma, updated 1993
SAPOLYS	Sensitive animal polygon location data for Point Loma, updated 1993

OTHER	
BND	(file is empty)
HISTSSPO	Historic sensitive polygon data for Point Loma
OLD	Contains the following 6 files: finmap, finmodel, pres, slope, veg & vegmap
PTMAP1	Contains the following 2 files that have no application associated with them: e0001.plt & e0002.plt
SPGRID	Stateplane grid

Appendix B.2. Channel Islands National Park, selected GIS data list.

The following datasets exist for all islands:

DOQQs (Digital Orthophoto Quarter Quads, which are ortho-rectified aerial photos)
DRGs (Digital Raster Graphics, which are scanned images of USGS topographic maps)
DLGs (Digital Line Graphics, which are line features such as roads, streams, and boundaries/shorelines)
DEMs (Digital Elevation Models, which are used to create contours and derive other elevation information such as slope and aspect)
NOAA Environmental Sensitivity Index Data for Southern California.

ISLAND	NAME	DESCRIPTION
Anacapa Resources		
	Anpfl	Peregrine falcon nest locations for sensitive resources project from researchers maps (G. Austin NPS)
	Anplants	All plant region coverage for sensitive resources from NPS maps from various historic records;
	Anplntpt	All plant point coverage; same as above
	Brperoost	Brown Pelican roosts as determined by NPS
	EAIveg	Vegetation from Hochberg et al., 1979 for East AI
	MAIveg	Vegetation from Hochberg et al., 1979 for Middle AI
	WAIveg	Vegetation from Hochberg et al., 1979 for West AI
	Npsseabrd	All sensitive areas for seabirds on Anacapa as determined by NPS
Anacapa I&M sites		
	Aikelpsites	Location of Kelp Forest Monitoring locations

	Airockysites	Location of Rocky Intertidal Monitoring locations
Anacapa Misc.		
	Aninvert	Closure for site bulletins; not correct to new shoreline
	Anna	Natural areas closure for site bulletins
	Bpfa	Brown pelican closure for site bulletins
	Anseabird	Closure for site bulletins
Santa Barbara Resources		
	Brandts	Roosting sites for Brandt's cormorants; used for new trail project review
	Dblcrest	Roosting sites for Double-crested cormorants; used for new trail project review
	Gulls1	Roosting sites for Western gulls; used for new trail project review
	Halvveg	Vegetation from Halvorson et al., 1988
	Kelpdist_88	Map of kelp distribution from 88 IR aerial photos
	Sbbathsutm20	20 m bathymetry contours around SBI
	Sbbirdland	Land rookeries for site bulletins
	Sbplants	All plants region coverage, for sensitive resources map, from NPS map from various records
	Sbplntpt	All plants point coverage, same as above
	Sbseabirds	shoreline buffers of seabird areas; used for site bulletins
	Sbseabirds2	same as sbseabirds without shoreline arcs
Santa Barbara I&M sites		
	Risites	Rocky Intertidal sites from GPS
Santa Barbara Miscellaneous		
	Sbtrails	New trails fall 98
	Sbtrailsold	Trails prior to fall 98
Santa Cruz Resources		
	Eastveg	From K. McEachern, 1996
	Escigeo1	Monterey shale polygons digitized from Weaver map
	Isthfennel2	% cover of fennel in proposed burn area
	Isthfire	Proposed fire perimeter
	Sceastbird	Esci coastal rookeries
	Scpfl	Peregrine falcon locations, from researchers map (G. Austin NPS)
	Scplants	All plant region coverage
	Scplants10	All plant region coverage in UTM10
Santa Cruz I&M sites		

	Escivegtrans	Location of vegetation monitoring transects on ESCI from GPS points
	Sckelpsites	Estimated locations of kfm monitoring sites around sci
Santa Cruz Miscellaneous		
	Easthydbuf	10 m buffer of eastend hydrology layer
	Eastpoly	NPS land edited to DOQ
	Eastwater	All sci with east watersheds
	Flood97	Digitization of 97 flood extent from aerial photos
	New esci	Area of ESCI after transfer
	Newtnc	Area of TNC after transfer
	Pigzones	Original suggestions from R. Klinger
	Pigzones3	Latest proposed zones for EIS
	Scfence	Fencelines corrected to DOQs
	Scplntpt	All plant point coverage
	Scroads	Roads corrected to DOQs
	Watershd6	Six major watersheds on SCI
	Watershedsclp	Original watershed designations from Grid analysis
	Sceasttrl	Not current
Santa Cruz Transfer		
	20 + layers relating to the TNC-NPS land transfer plus the following:	
	Survnad27	Points from survey for western isthmus boundary and inholdings in NAD27
	Survnad83	Points from survey for western isthmus boundary and inholdings in NAD83
	Newisthms	W. boundary of transfer area to current NPS/TNC boundary
San Miguel Resources		
	Smpfl	Peregrine falcon nest locations from researchers (G. Austin NPS)
	Smplants	All plant region coverage
	Smplntpt	All plant point coverage
	Vegmap79	Vegetation from Hochberg et al., 1979
	Vegmap84	Vegetation from Lenihan and Veirs, 1984
	Vegmap91	Vegetation from D'Antonio et al., 1991
	Vegmap94	Modification of vegmap91 to DOQs and to be more representative of fox habitat, by NPS 1994
San Miguel I&M sites		
	Dlbgridnet	Grid to use for DLB until GPS points are available
	Foxgpstc	Some trap GPS locations taken by T. Coonan, summer 1997
	Foxgridnet	Old grid from protocol; superceded by GPS grid

	Foxgridpnt	Old trap point locations from protocol
	Foxwcgps	Some GPS points for WC grid taken in 1997
	Herpgps	Two lines for airstrip transects, taken from GPS by H. David, summer 1997
	Kelpsites	General locations, not from GPS
	Newfox	Use this grid for trap locations from now on
	Newfoxpnt	Points generated by ArcInfo from representative GPS points
	Pitfall	Pitfall trap locations GPS'd by H. David, summer 1997
	Rockysites	Approximate locations of Rocky Intertidal monitoring sites
Santa Rosa Resources		
	Rarsurvutm	Areas designated by K. McEachern as being thoroughly and not thoroughly surveyed for rare plants. Classification: A = surveyed, B = not surveyed but likely are for rare plants, C = not surveyed, not likely area for rare plants
	Srbaregr	Areas bare of vegetation as queried from vegetation map
	Srchap	Areas of chaparral as queried from vegetation map
	Srcss	Areas of coastal sage scrub as queried from vegetation map
	Srgeo	Geology from Weaver, with code of geotype
	Srpfl	Peregrine falcon nest locations for sensitive resources map. From researchers (G. Austin NPS)
	Srplants	All plants region coverage (Currently the plant data layers for Santa Rosa are the only ones that include records for weedy species.)
	Srplntpt	All plants point coverage
	Srveg	Vegetation map from Clark et al. 1990
	Vegwpig	Vegetation polygons with pig kill sites remaining
Santa Rosa I&M sites		
	Srkelpsites	fix topology; points, estimates only
	Srrockysites	fix topology; rocky intertidal monitoring sites. Estimates only
Santa Rosa Miscellaneous		
	Bchcamping	general polygon around shore about ¼ mile out
	Oldranchwater	single watershed
	Quemadawater	single watershed
	Roads	Roads corrected to 1994 DOQs
	Srpasturea	Fencelines creating pasture polygons, circa 1996
	Srstreamsbuf	200m each side of stream - correct to DOQs
	Watersheds	All watersheds for SRI
	Wshdveg	Watersheds boundaries divide vegetation polygons

All Islands

Bufnet	1.8 kilometer polygon around islands not including Prince and Sutil islands
Islandsnet	1 mile polygon around islands, including only Prince and Sutil
Islbufnet	1 mile polygon around islands, including none of the offshore islands
Kelp1	General kelp locations copied from Fish and Game map
Kfmsites11	General site locations (not GPS) for KFM sites
Nmsbdy_utm11	Boundary of sanctuary waters including area of islands
Nmswater11	Boundary of sanctuary waters not including area of islands
Risties	General locations of Rocky Intertidal sites

Not NPS Islands

Calif_alb	California shoreline – albers
Calif_utm	California shoreline – UTM11
Calif_utm10	California shoreline – UTM10
Camarillolat	DEM of Camarillo quad
Catdlg	Catalina DLG
Catshrln_alb	Catalina shoreline – albers
Catshrln_utm	Catalina shoreline – UTM11
Ptmugulat	DEM of Pt. Mugu quad
Sbcntydem	DEM of Santa Barbara county
Scldlg	San Clemente DLG
sclshrln_alb	San Clemente shoreline – albers
sclshrln_utm	San Clemente shoreline – UTM11
Shorcntr	Elevations of some of mainland topos.
Shorlinelat	Elevations for same topos. As shorcntr
Snidlg	San Nicolas DLGs
Snishrln_alb	San Nicolas shoreline – albers
Snishrln_utm	San Nicolas shoreline – UTM11
Venturalat	DEM of Ventura quad

B.3. Santa Monica Mountains National Recreation Area, Geographic Data List as of June, 1999

Santa Monica Mountains National Recreation Area, Geographic Data List as of June, 1999.

Data covers entire main mountain area (14 USGS 7.5' quadrangles: Point Mugu, Camarillo, Triunfo Pass, Newbury Park, Point Dume, Thousand Oaks, Malibu, Calabasas, Topanga, Canoga Park, Beverly Hills, Van Nuys, Hollywood, Burbank) unless otherwise noted. Layers in bold are available in listed format for public distribution. Fees may be charged to cover distribution costs. Some of these

data may be available over the internet. Inquiries for other data layers should be directed to the listed owner of the data. For more information regarding this list, contact Denise Kamradt at (805) 370-2337, denise_kamradt@nps.gov.

Digital data currently residing with NPS - Owner	Scale	Format
California Natural Diversity Data Base (January 1997) - CDFG	1:24,000	ARC
Database compiled by California Department of Fish and Game from records submitted by field biologists. Data was not collected in a systematic manner. Accuracy and precision of information varies. Data is known to be incomplete and out-of-date in this area. See CDFG for complete metadata.		
California State Assembly Districts (1995) - TDC	1:100,000	ARC
See Teale Data Center for documentation		
1990 Census geography - CB	1:100,000	TIGER
Tiger line files include blocks and tracts. See U.S. Bureau of Census for complete documentation.		
1990 Census Tracts - TBM	1:24,000	ARC
Proprietary data. See Thomas Bros. Maps for more information.		
City and County Boundaries - TBM	1:24,000	ARC
Propietary data. See Thomas Bros. Maps for more information.		
County Boundaries - CDFG	1:24,000	ARC
Data came with CNNDB; provenance unknown. See CDFG for more information.		
Congressional Districts (1995) - TDC	1:100,000	ARC
See Teale Data Center for documentation		
Digital Elevation Model, Level 1 (DEM) - USGS	**30 meter**	**USGS**
See USGS for complete metadata		
Digital Elevation Model, Level 2 (DEM) - USGS	**30 meter**	**USGS**
See USGS for complete metadata.		
Digital Elevation Model (DEM) – USGS	**10 meter**	**USGS**

10 meter DEMs exist in the study area for the following USGS 7.5’ quads: Simi Valley East, Oat Mountain, San Fernando, Sunland, Thousand Oaks, Calabasas, Canoga Park, Van Nuys, Burbank, Triunfo Pass, Point Dume, Malibu, Topanga, Beverly Hills, Hollywood.

Digitial Orthorectified Quarter Quadrangles (DOQQ) – USGS 1:12,000/1 m USGS

Developed from 1989 color infrared high altitude aerial photography. One meter pixel resolution.

Drainage Basins - RWQCB 1:24,000 ARC

Digitized from USGS 7.5' topographic maps at California State University, Fullerton. Includes administrative boundaries as well as natural boundaries. Contact RWQCB for more information.

Fall 1993 fire perimeters, burned structures, progression - NPS, CDF unknown ARC/GPS

Mapping done by contractor for LA and Ventura County Fire Departments from helicopter for Green Meadow and Topanga fires using differentially corrected GPS. Topanga fire progression mapped from field records of fire equipment.

Fall 1996 fire perimeters, progression - NPS, CDF/LACFD various ARC

Boundary mapped by LACFD from helicopter without differential correction. Fire progression mapped from field reccords and fire intensity mapped from field work and fire history.

Fire History (>100 acres, 1925-present) - NPS/LACFD/VCFD 1:24,000 ARC

Perimeters of all fires greater than 100 acres in Santa Monica Mountain zone from 1925 to present. Fires through 1992 digitized from maps drafted on USGS 7.5' base. Hardcopy maps provided by LA and Ventura County Fire Departments. Digitizing done by John Wickham, CSUN intern, in April 1993. Subsequently processed by Denise Kamradt, NPS. Fires from 1993 through present, mapped by GPS and/or field survey. Database updated yearly.

Geology - USGS 1:24,000 ARC

USGS has digital geology mapping project underway for the Los Angeles 1:100,000 quad, completing work on a 1:24,000 quad basis, estimated completion end of FY 1997, funding will move timeline up, contact Don Gautier or Doug Morton, USGS Western Branch of Geology, Menlo Park, CA (415) 329-4909. As of January 1998, completed quads are: Calabasas, Canoga Park, Thousand Oaks, Point Dume, Van Nuys, Beverly Hills, Burbank, Hollywood, San Fernando, Oat Mountain, Simi Valley East and West, and Moorpark.

Hydrography - TBM 1:24,000 ARC

Propietary data. See Thomas Bros. Maps for more information.

Hydrography - USGS 1:24,000 ARC/DLG

USGS 7.5' DLGs for hydrography exist for the following USGS 7.5' quads: Point Mugu, Camarillo, Triunfo Pass, Newbury Park, Thousand Oaks, Point Dume, Calabasas, Malibu Beach, Topanga, Beverly Hills. See USGS for complete metadata.

Hypsography - USGS 1:24,000 ARC/DLG

USGS 7.5' DLGs for hypsography exist for the following USGS 7.5' quads: Point Mugu, Camarillo, Triunfo Pass, Newbury Park, Thousand Oaks, Point Dume, Calabasas, Malibu Beach, Topanga, Beverly Hills. See USGS for complete metadata.

LA County Assessor Parcels - LACDRP 6”-1’ acc. ARC

This is converted CAD data without GIS topology. Data has been georeferenced.

LA County General Plan - SCAG ? ARC

General Plan boundaries for Los Angeles County. See SCAG for more information.

1990 Land Use (2.5/5 acre mmu) - SCAG 1:24,000 ARC

1990 land use mapped by a consortium (lead agency - SCAG) from 1:24,000 aerial photography. A five acre minimum mapping unit was employed except for sensitive uses (e.g. schools, hospitals, etc.). Contact SCAG for more information.

1993 Land Use (2.5/5 acre mmu) - SCAG 1:24,000 ARC

1993 land use mapped by a consortium (lead agency - SCAG) from 1:24,000 aerial photography. A five acre minimum mapping unit was employed except for sensitive uses (e.g. schools, hospitals, etc.). Contact SCAG for more information.

National Wetlands Inventory - USFWS 1:24,000 ARC/DLG

Mapped from 1:65,000 aerial photography. See USFWS for complete metadata.

NPS Land Protection Plan - NPS 1:24,000 ARC

Derived from property tract database. Attribute data updated at least yearly by NPS. See property data for more information.

NPS property tracts and ownership - NPS 1:24,000 ARC

Digitized from maps drafted on USGS 7.5' topographic base. Original maps produced by lands office at Western Region headquarters of NPS. Maps drafted at six different scales, digitized and edge-matched in GRASS GIS by contractor in 1992. Converted to Arc/Info and maintained in Arc/Info by NPS. Updated at least yearly. Updated linework heads-up digitized from county assessor maps and registered to Thomas Bros. Maps roads (see listing) and LA County Assessor Parcels (see listing). Attributes include public ownership details and Land Protection Plan codes. Cross referenced to Assessor Parcel database. Data extends outside of NRA boundary only where major areas of public parkland exist adjacent to NRA.

Public Land Survey - BLM 1:24,000 ARC

1990 (LA County), 1995 (Ventura County) Roads - TBM 1:24,000 ARC

Propietary data. See Thomas Bros. Maps for more information.

Santa Monica Mountains NRA Boundary - NPS 1:24,000 ARC

Derived from NPS property tracts.

Santa Monica Mountains Zone - NPS 1:24, 000 ARC

Digitized from unknown source by NPS.

Scanned Topographic Maps - NPS 250 DPI TIFF

Scanned, georeferenced and tiled by Land Info, Colorado. Retiled by Scott Walker, Marco Morais, NPS. USGS 7.5' Topographic maps were scanned at 250 dpi and delivered as TIFF files.

Significant Ecological Areas - NPS 1:24,000 ARC

Contains areas desiginated as special natural and cultural places by NPS and LA County. Original mapped source unknown. Digitized by NPS.

Soils of Malibu Area - NRCS 1:24,000 ARC

Original mapped data from "Soils of the Malibu Area" (1967, Soil Conservation Service). Redrafted onto USGS 7.5' topographic base under SCS supervision by students at Cal Poly Pomona. Subsequently digitized in 1995 by NPS (contractor: Vestra Resources, Redding, California).

Soils of Ventura Area - NRCS 1:24,000 ARC

Original mapped data from "Soil Survey Ventura Area, California" (1970, Soil Conservation Service). Subsequently digitized and ortho-rectified using USGS 7.5' DEMs in 1995 by NPS (contractor: Vestra Resources, Redding, California).

SPOT Panchromatic Satellite Imagery 1993 - SPOT 10 m cell BIL

TM Satellite Imagery (resampled) 199? - UCSB (Gap) 100 ha cell BIL

See Southwestern Gap Analysis reports (Frank Davis, et al., UCSB) for details.

TM Satellite Imagery 1982 - NPS 30 m cell BIL

TM Satellite Imagery 1985 - NPS 30 m cell BIL

TM Satellite Imagery 1993 - NPS 30 m cell BIL

Trail Map of the Santa Monica Mtns - TH 1:24,000 ARC

Mylar separates of published Tom Harrison maps scan-digitized and georeferenced by NPS (contractor: Geographic Resource Solutions, Arcata, CA) with permission from Tom Harrison. Maps cover western and central portion of Santa Monica Mountains. For more information about source maps see published maps.

Public Trails - NPS 5 meter ARC

Mapped by GPS using a Trimble Pathfinder ProXL and a Trimble Pathfinder Basic+ by student interns and NPS staff. Data was differentially corrected. Attributes include trail width and trail features: water bars, picnic areas, steps. Attribute data not collected for all trails. This database will be expanded and updated by NPS as resources allow.

1993 Vegetation, modified Holland classification- NPS 5 acre mmu ARC (GRID)

Raster data from 1993 TM scene, aerial photos and field survey. Developed and field checked by Jennifer Swenson and David Shaari at SDSU. See project report for details.

1983 Vegetation/landuse (not field checked) - NPS 1:24, 000 ARC

Developed from photo interpretation of 1:12,000 CIR aerial photography by NPS GIS Division, Denver, CO. Digitized into GRASS and converted to Arc/Info vector format. No systematic accuracy assessment or field check performed. Contains known errors.

Vegetation - UCSB (Gap) 100 ha mmu ARC

See Southwestern Gap Analysis reports (Frank Davis, et al., UCSB) for details.

Ventura County General Plan - SCAG ? ARC

General Plan boundaries for Ventura County. See SCAG for more information.

Ventura County Lot Maps (From COGO) - VCDPW 6"-1' acc. CAD

DXF files of map sheets output from System 9. Not georeferenced.

1990 Zip Code Areas - TBM 1:24,000 ARC

Propietary data. See Thomas Bros. Maps for more information.

Digital data (in progress by NPS):

Archeological Sites - NPS 1:24,000 ARC

Existing maps digitized by NPS staff in 1994 from mylar maps on USGS 7.5' topographic base. Maps traced from maps held at UCLA repository (see Phil Holmes for details). Current project includes more thorough search, compilation and digitizing of archeological information.

Fire Effects Monitoring Plots - NPS 2-5 m acc. ARC

Historic Resources - NPS 1:24,000 ARC

Native grasslands - NPS 5-10 m acc. ARC

Riparian vegetation (species composition) - NPS 1:24,000 ARC

Riparian boundaries derived from 1983 vegetation data (see listing for details). Subsequently checked in the field for existence, approximate shape and extent and species composition. Report on methods and results is forthcoming.

Sensitive plant species and communities - NPS 2-5 m acc. ARC

Sensitive animal species - NPS 2-5 m acc. ARC

Vegetation Type Maps (1930s Wieslander maps) - CPP 1:62,500 ARC

Digital data (in progress by other agencies):

Digital Elevation Model (DEM) – USGS	10 meter	USGS

10 meter DEMs are being developed for the remaining USGS 7.5' quads in the study area: Santa Paula, Moorpark, Simi Valley West, Camarillo, Newbury Park, Point Mugu.

Geology - USGS	1:24,000	ARC

USGS in progress converting geologic mapping to digital format. 7.5' quadrangles in study area include: Malibu Beach, Triunfo Pass, Topanga. (USGS has digital geology mapping project underway for the Los Angeles 1:100,000 quad, completing work on a 1:24,000 quad basis, no estimated completion date. Funding will move timeline up.

Soil Survey - NRCS	1:24,000	ARC

Vegetation structure – AVIRIS

Aerial Photography (not digital):

1994 CIR prints w/index (2 sets)	1:24,000
1994 Color prints w/index (2 sets)	1:12,000
1988 Color prints w/index (2 sets)	1:12,000
1983 CIR prints w/index	1:12,000
1983 CIR prints w/index	1:24,000
1980 CIR prints and transparencies w/index	1:12,000

Published Maps (not digital):

USGS 7.5' Topographic series (paper)	1:24,000
USGS 7.5' Topographic series (mylar)	1:24,000
USGS 7.5' Orthophoto series (acetate)	1:24,000
USGS 1:100,000 Topographic series	1:100000
Flood Insurance Rate Maps	1:24,000
Vegetation Type Maps (1930s Wieslander maps)	1:62,500
National Wetlands Inventory	1:24,000

Dibblee Geologic maps	1:24,000
Trails of the Santa Monica Mountains (Tom Harrison)	1:24,000
Santa Monica Mountains National Recreation Area (Trails Illustrated)	1:37,000

Data origin/ownership:

CB = U. S. Bureau of the Census
CDF = California Department of Forestry and Fire Protection
CDFG = California Department of Fish and Game
CPP = Cal Poly Pomona
CSF = Cal State University, Fullerton
LACDPR = L.A. County Department of Regional Planning
LACDPW = L.A. County Department of Public Works
LACFD = Los Angeles County Fire Department
NPS = National Park Service, Santa Monica Mountains NRA
SCAG = Southern California Association of Governments
NRCS = Natural Resources Conservation Service (formerly Soil Conservation Service)
RWQCB = Regional Water Quality Control Board
TBM = Thomas Bros. Maps
TDC = Teale Data Center, State of California
TH = Tom Harrison Cartography
UCSB = University of California, Santa Barbara
VCDPW = Ventura County Department of Public Works
VCFD = Ventura County Fire Department

Appendix C: Bibliography

C.1. Cabrillo National Monument – Bibliography

Appendix C.1. Cabrillo National Monument - Bibliography

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Appendix D: Workshop Participants

Appendix D. Mediterranean Coast Network Biological Inventory Workshop Participants List

Name	Attended	Affiliation
Dr. Allison Alberts		San Diego Zoo
Mr. Douglas Allan		Santa Monica College
Dr. James Allen		Southern California Coastal Water Research Project
Dr. Larry Allen		California State University, Northridge
Mr. Larry Allen	*	Los Angeles County Breeding Bird Atlas
Mr. Erik Aschehoug		The Nature Conservancy
Mr. Pat Atchison		Ogden Corporation
Ms. Kristine Barsky		California Department of Fish and Game
Dr. Ellen Bauder		San Diego State University
Mr. Kent Beaman		Los Angeles County Museum of Natural History
Mr. Mitch Beauchamps		Pacific Southwest Biological Services
Ms. Bonnie Becker	*	Cabrillo National Monument
Mr. Jim Benedict		Santa Monica Mountains National Recreation Area
Dr. Mary Bergen		California Department of Fish and Game
Mr. Peter Bloom	*	Western Foundation of Vertebrate Zoology
Dr. Douglas Bolger		Dartmouth College
Mr. Peter Bowler		University of California, Irvine
Mr. Steve Boyd		Rancho Santa Ana Botanic Garden
Mr. Eric Brooks	*	Santa Monica Mountains National Recreation Area
Dr. Patricia Brown	*	Brown-Berry Biological Consulting
Dr. Lorraine Buckley		Oxnard College
Dr. Marybeth Buechner		Consumnes River College
Mr. Rick Burgess	*	California Native Plant Society
Dr. Bill Bushing		The Santa Catalina Island Conservancy
Mr. Gary Busteed		Santa Monica Mountains National Recreation Area
Mr. Kenneth Campbell		Los Angeles County Museum of Natural History
Mr. Harry Carter		USGS BRD - Western Ecological Research Center
Dr. Ted Case		University of California, San Diego
Ms. Sarah Chaney	*	Channel Islands National Park

Ms. Katie Chess	*	USGS-BRD-WERC-Channel Islands Field Station
Ms. Ronnilee Clark		California Department of Parks and Recreation
Dr. Martin Cody		University of California, Los Angeles
Mr. Paul Collins	*	Santa Barbara Museum of Natural History
Dr. Barbara Collins		California Lutheran University
Ms. Tamara Conkle		United States Navy - Natural Resources Office
Mr. Tim Coonan	*	Channel Islands National Park
Dr. Scott Cooper		University of California, Santa Barbara
Mr. Dan Cooper	*	Los Angeles Audubon Society
Dr. Kevin Crooks		University of California, San Diego
Mr. Kevin Cummins	*	San Diego State University
Ms. Rosi Dagit	*	Resource Conservation District of the Santa Monica Mountains
Mr. Craig Dalby		National Park Service, Pacific West Region
Dr. Frank Davis	*	University of California, Santa Barbara
Dr. Steve Davis	*	Pepperdine University
Mr. Gary Davis	*	Channel Islands National Park
Dr. Paul Dayton		University of California, San Diego - Marine Life Research Group
Ms. Kathy de Wet-Oleson		NOAA, National Ocean Service
Dr. Robert DeLong		NOAA, National Marine Fisheries Service
Ms. Diane Devine		The Nature Conservancy
Mr. Terry Di Mattio	*	Cabrillo National Monument
Dr. James Diffendorfer		San Diego State University
Dr. John Dixon		California Coastal Commision
Ms. Shana Dodd		SCDodd Biological Consulting
Mr. Charles Drost		USGS BRD - Forest and Rangeland Ecosystem Science Center
Mr. John Duffy		California Department of Fish and Game Commision
Dr. Jennifer Dugan		University of California, Santa Barbara
Ms. Mary Elaine Dunaway		Minerals Management Service
Ms. Linda Dye	*	Channel Islands National Park
Mr. Art Eck	*	Santa Monica Mountains National Recreation Area
Mr. Paul Edelman	*	Santa Monica Mountains Conservancy
Mr. Claude Edwards		
Dr. Jack Engle		University of California, Santa Barbara
Mr. Ed Ervin		USGS BRD - Western Ecological Research Center
Mr. Michael Evans		
Dr. Exequiel Ezcurra		San Diego Natural History Museum
Ms. Krista Fahy		Santa Barbara Museum of Natural History
Ms. Maurya Falkner		California State Lands Comission
Dr. Steven Fancy	*	National Park Service, Inventory and Monitoring Program
Mr. Rick Farris	*	United States Fish and Wildlife Service
Ms. Kate Faulkner	*	Channel Islands National Park
Dr. Gary Fellers		USGS BRD - Western Ecological Research Center
Dr. Wayne Ferren		University of California, Santa Barbara

Dr. Robert Fisher		USGS BRD - Western Ecological Research Center
Dr. Janet Franklin		San Diego State University
Dr. Todd Fuller		University of Massachussetts, Amhearst
Dr. John Gamon		California State University, Los Angeles
Mr. Kimball Garrett		Los Angeles County Museum of Natural History
Mr. Jay Goldsmith		National Park Service, Pacific West Region
Ms. Suzanne Goode	*	California Department of Parks and Recreation
Ms. Patricia Gordon-Reedy		Conservation Biology Institute
Mr. Peter Haaker		California Department of Fish and Game
Dr. John Heyning		Los Angeles County Museum of Natural History
Mr. James Hogue	*	California State University, Northridge
Dr. Bradford Hollingsworth		San Diego Natural History Museum
Ms. Ines Horovitz		Los Angeles County Museum of Natural History
Mr. Dave Janiger		Los Angeles County Museum of Natural History
Mr. Steve Junak	*	Santa Barbara Botanical Garden
Ms. Denise Kamradt	*	Santa Monica Mountains National Recreation Area
Dr. Lee Kats	*	Pepperdine University
Dr. Jon Keeley	*	USGS BRD - Western Ecological Research Center
Mr. Jim Kellogg		Tierra Data Systems
Ms. Jo Kitz		California Native Plant Society
Mr. David Kizirian		Los Angeles County Museum of Natural History
Mr. Robert Klinger		University of California, Davis
Dr. Mietek Kolipinski		National Park Service, Pacific West Region
Mr. Daryl Koutnik		County of Los Angeles
Mr. Bill Kristan		USGS BRD - Western Ecological Research Center
Mr. Steve Lacy		Ogden Corporation
Dr. Kevin Lafferty		University of California, Santa Barbara
Mr. Jan Larson		Unites States Navy - Natural Resources Office
Dr. Lyndal Laughrin	*	University of California, Santa Barbara
Dr. Robert Lea		California Department of Fish and Game
Mrs. Patricia Lock-Dawson	*	USGS BRD - Western Ecological Research Center (WERC)
Dr. Milton Love		University of California, Santa Barbara
Dr. Jeff Lovich		USGS BRD - Western Ecological Research Center
Ms. Lynn Lozier		The Nature Conservancy
Mr. David Magne		California Native Plant Society
Mr. Sean Manion	*	Resource Conservation District of the Santa Monica Mountains
Ms. Paige Martin	*	Channel Islands National Park
Dr. Jennifer Matos		California State University, Northridge
Dr. Rudi Mattoni	*	
Ms. Deborah McArdle		National Sea Grant Extension Program
Dr. Lee McClenaghan		San Diego State University
Dr. Kathryn McEachern	*	USGS-BRD-WERC-Channel Islands Field Station
Ms. Mary Meyer	*	California Department of Fish and Game

Dr. Anthony Michaels		University of Southern California
Ms. Karen Miner		California Department of Parks and Recreation
Mr. Steve Montgomery		SJM Biological Consultants
Ms. Corrina Morin	*	
Dr. Steve Murray		California State University, Fullerton
Mr. Tom Nichols		National Park Service, Pacific West Region
Mr. Thomas Oberbauer		County of San Diego
Ms. Kimberly O'Conner	*	United States Navy - Natural Resources Office
Dr. John O'Leary		San Diego State University
Mr. Mitch Perdue		Unites States Navy - Natural Resources Office
Dr. Ralph Philbrick		Santa Barbara Botanical Garden
LCDR Matt Pickett		NOAA, National Ocean Service
Dr. Elizabeth Pierson		North American Bat Conservation Project
Mr. David Pivorunas		Unites States Navy - Natural Resources Office
Dr. Dan Pondella		Occidental College
Dr. Mary Price		University of California, Riverside
Dr. Jon Rebman		San Diego Natural History Museum
Dr. Dan Reed		University of California, Santa Barbara
Mr. Craig Reiser		San Diego Natural History Museum
Mr. Dan Richards		Channel Islands National Park
Dr. Seth Riley	*	Santa Monica Mountains National Recreation Area
Mr. Dirk Rodriguez	*	Channel Islands National Park
Dr. Gary Roemer	*	University of California, Los Angeles
Ms. Heather Rose	*	Resource Conservation District of the Santa Monica Mountains
Dr. John Rotenberry		University of California, Riverside
Mr. Jamie Rottenberg	*	University of California, Riverside
Dr. Phil Rundel	*	University of California, Los Angeles
Ms. Adrienne Russell	*	San Diego State University
Mr. Walt Sakai	*	Santa Monica College
Mr. Mike San Miguel		
Mr. Andrew Sanders		University of California, Riverside
Dr. Raymond Sauvajot	*	Santa Monica Mountains National Recreation Area
Mr. Vince Scheidt		
Dr. Paula Schiffman		California State University, Northridge
Ms. Cathy Schwemm	*	Channel Islands National Park
Mr. Jeff Seigel	*	Los Angeles County Museum of Natural History
Mr. Tim Setnicka		Channel Islands National Park
Mr. Mike Shane	*	HUBBS-Sea World Research Institute
Mr. Jim Shevock		National Park Service, Pacific West Region
Ms. Diana Simons	*	
Dr. Mike Simpson		San Diego State University
Ms. Rorie Skei	*	Santa Monica Mountains Conservancy
Dr. Jeffrey Smallwood		California State University, Northridge

Dr. Wayne Spencer		Conservation Biology Institute
Mr. Anthony Spina		NOAA, National Marine Fisheries Service
Ms. Jerre Stallcup		Conservation Biology Institute
Mr. Drew Stokes		USGS BRD - Western Ecological Research Center
Mr. Andrew Suarez	*	University of California, San Diego
Dr. Camm Swift	*	Los Angeles County Museum of Natural History
Ms. Alexandra Syphard	*	San Diego State University
Dr. Mia Tegner		University of California, San Diego - Marine Life Research Group
Mr. Tim Thomas	*	United States Fish and Wildlife Service
Mr. John Tiszler	*	Santa Monica Mountains National Recreation Area
Mr. Scott Tremor		San Diego Natural History Museum
Mr. Phil Unitt		San Diego Natural History Museum
Ms. Patty Vainik		City of San Diego, Metropolitan Wastewater Department
Dr. Tom Vandergon	*	Pepperdine University
Ms. Lisa Verhoeven	*	Santa Monica Mountains National Recreation Area
Mr. Dave Verity		
Dr. Hartmut Walter	*	University of California, Los Angeles
Dr. Robert Wayne		University of California, Los Angeles
Ms. Samantha Weber	*	Cabrillo National Monument
Dr. Walter Wehtje	*	Western Foundation of Vertebrate Zoology
Dr. Stephen Weisberg		Southern California Coastal Water Research Project
Dr. Dieter Wilken		Santa Barbara Botanical Garden
Dr. Paul Wilson		California State University, Northridge
Mr. Carl Wishner	*	Envirocom Corporation
Dr. Marti Witter	*	City of Malibu
Ms. Patricia Wolf		California Department of Fish and Game
Dr. Charles Woodhouse		Santa Barbara Museum of Natural History

Appendix E: Workshop Materials

National Park Service Biological Inventories Workshop Agenda

National Park Service Biological Inventories Workshop

Hyatt Westlake Plaza, Thousand Oaks, California
June 14-15, 2000

Wednesday, June 14

10:00 Welcome (Plenary)

10:15	Introduction to workshop -Review agenda and materials -Review workshop goals and objectives
10:30	Overview of NPS Inventory Initiative
11:15	Review workshop process -Overview of process -Review worksheets -NPSpecies demonstration -Review maps and databases -Group assignments
12:00	Lunch
1:00	Workgroup Meetings: Review data, identify gaps, list future inventory needs -Vegetation -Mammals -Birds -Fish -Reptiles and Amphibians
3:00	Break
3:15	Workgroups continue
4:00	Workgroups summarize information
4:00	Review workgroup summaries (Plenary session)
5:00	Adjourn

Thursday, June 15

8:30	Welcome and introduction -Recap workshop goals and objectives -Recap work to date -Review agenda and process

8:45	Overview of Park Objectives -Channel Islands National Park -Santa Monica Mountains National Recreation Area -Cabrillo National Monument
9:30	Divide into workgroups to discuss methods and sampling design
10:15	Break
10:30	Reconvene workgroups
12:00	Lunch
1:00	Reconvene workgroups
3:00	Break
3:15	Groups summarize information
3:45	Discuss group summaries (Plenary session)
4:30	Adjourn

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National Park Service Biological Inventories Workshop Worksheets

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Mediterranean Parks Biological Inventory Workshop
June 14-15, 2000

Hyatt Westlake Plaza
Thousand Oaks, California

Instructions to Workgroups

Attached are two worksheets that you will use during the course of this workshop. You will use these in conjunction with other materials provided to you. Worksheet 1 will be used on the first day and worksheet 2 will be used on the second day. Worksheet 1 will be used in conjunction with the (1) species lists for each park, (2) lists of GIS coverages for each park, and (3) bibliographies for each park. Worksheet 2 will be used with the list of inventory objectives for each park. All of these materials should have been included in the packet of information you received at the beginning of the workshop.

Please review these materials and use them to answer the following questions. Please make every effort to address each of the following questions in as much detail as possible. We will be using this

information to develop a study plan and need it to be as complete as possible. Use additional sheets to continue your answers if necessary.

Worksheet 1 for Day 1: Review of Park Information (inventories and databases)

1. Please review the species list for each park for the taxanomic group with which you are familiar. Do you know of other species that have been observed in any of the parks? (Circle YES or NO). If yes, is there written or physical documentation that we can reference?

2. If an in depth inventory was conducted over a 2 year period for this taxonomic group, which species do you think would be located/found that are now missing from this list?"

3. Please review the list of GIS themes for each park. Do you know of any other GIS themes that are relevant in these parks that we should know about?

4. Do you know of any other datasets or databases that may be relevant?

5. Please review the bibliography for the lifeform groups with which you are most familiar. Do you know of any additional publications not listed or in press?

Please continue your answers on attached sheets if necessary. Please indicate the group in which you are participating.

Mediterranean Parks Biological Inventory Workshop
June 14-15, 2000

Instructions for Workgroups

Please review the inventory objectives for each park (included in your information packet). Using your knowledge of

sampling design and methods, in conjunction with the results from Day 1 of the workshop, please answer the following questions.

Worksheet 2 for Day 2: Designing Surveys and Identifying Methods to Meet Inventory Objectives

1. Please discuss sampling designs for the taxanomic group with which you are most familiar. Review the inventory objectives for each park. Using these as your guide, please suggest the most appropriate sampling approach to achieve those objectives.

2. What costs would be associated with this design? Specifically, how many investigators and technicians would be needed? When and how often should the sampling occur? Any specialized equipment required to carry out the study?

3. Do you have suggestions for database development and products that will help us integrate data among the various inventories (including non-biological inventories) and make better use of data for park natural resource management?

4. Who are the most qualified subject experts for each of the taxanomic groups who can assist the National Park Service in conducting inventories of vertebrates and vascular plants? Please suggest 3-5 experts per taxa.

5. Are there other agencies or groups that might be willing to combine their resources with this effort to achieve common goals? Please describe specific examples of opportunities for partnerships and collaboration.

Please attach additional sheets if necessary. Please indicate in which group you are participating.

-

Appendix F: Channel Islands National Park Alien Plant Species

Appendix F. Channel Islands National Park - alien plants targeted for survey by SBBG and UCSB in 1998, final version compiled 1999.

Used for Alien Plant Ranking System (APRS.exe) workshop, January 11-12, 2000
Channel Islands National Park

This list is derived from the list of all the alien plants occurring in CHIS. We have included all species that a) may present severe threats to native plant communities and/or native animal habitat, particularly to sensitive habitats and/or species, and that b) about which the Park lacks sufficient information to effectively identify and prioritize control measures.

The list was complied by Sarah Chaney (CHIS), and reviewed/annotated by Steve Junak and Dieter Wilken (SBBG).

In addition to those species on this list, CHIS would like to have distributional information on any newly-recorded alien species, or any not on this list that seem to the surveyor to need to be considered for active control efforts by CHIS.

Aizoaceae
Malephora crocea
Mesembryanthemum crystallinum crystalline iceplant; *M. nodiflorum* small-flowered iceplant
Tetragonia tetragonioides New Zealand spinach
Amaranthaceae
Amaranthus albus tumbleweed; *A. deflexus* low amaranth
Apiaceae
Apium graveolens celery
Conium maculatum poison hemlock
Foeniculum vulgare sweet fennel
Torilis nodosa knotted hedge-parsley
Apocynaceae
Vinca major periwinkle
Asteraceae
Anthemis cotula mayweed
Arctium sp. burdock
Carduus pycnocephalus Italian thistle
Centaurea solstitialis yellow star-thistle; C. *melitensis* tocalote
Chamomilla suaveolens (=*Matricaria matricarioides*) pineapple weed
Cichorium intybus chicory
Cirsium vulgare bull thistle; *C. ochrocentrum* Beaumont thistle
Conyza bonariensis flax-leaved fleabane; *C. canadensis* horseweed
Cotula coronopifolia brass buttons; *C. australis* Australian brass buttons
Erechtites glomerata Australasian fireweed
Filago gallica narrow-leaved filago
Lactuca serriola prickly lettuce; *L. saligna* willow lettuce
Picris echioides bristly ox-tongue
Senecio vulgaris common groundsel
Silybum marianum milk thistle
Sonchus asper prickly sow-thistle; S. *oleraceus* common sow-thistle; (*S. tenerrimus* slender sow-thistle)
Taraxacum officinale common dandelion
Tragopogon porrifolius salsify; oyster plant

Xanthium spinosum spiny clotbur; *X. strumarium* cocklebur

Brassicaceae

Brassica nigra black mustard; *B. rapa* field mustard; *Hirschfeldia incana* short-podded mustard

Cakile maritima ; *C. edentula* sea rocket

Capsella bursa-pastoris shepherd's purse

Cardaria draba hoary cress

Cornopus didymus lesser wart-cress

Lobularia maritima sweet alyssum

Raphanus raphanistrum jointed charlock; *R. sativus* wild radish

Sinapis arvensis (=*Brassica kaber*) charlock

Sisymbrium irio London rocket; *S. officinale* hedge mustard; *S. orientale*

Caryophyllaceae

Cerastium glomeratum mouse-eared chickweed

Herniaria hirsuta ssp. *cinerea*

Polycarpon tetraphyllum four-leaved all-seed

Silene gallica windmill pink

Spergularia bocconii sand spurrey; *S. arvensis* ssp. *arvensis* corn-spurrey; *S. villosa* hairy sand-spurrey

Stellaria media common chickweed

Chenopodiaceae

Atriplex semibaccata Australian saltbush

Atriplex triangularis spear-leaved saltbush

Chenopodium ambrosioides Mexican tea; *C. multifidum* cutleaf goosefoot; *C. murale* nettle-leaf goosefoot

Salsola tragus (=*S. iberica*) Russian-thistle, tumbleweed

Convolvulaceae

Convolvulus arvensis bindweed

Euphorbiaceae

Chamaesyce maculata spotted spurge

Euphorbia peplus petty spurge

Fabaceae

Acacia melanoxylon blackwood acacia

Lotus corniculatus bird's foot trefoil

Medicago polymorpha bur clover

Medicago sativa alfalfa

Melilotus indicus yellow sweet-clover; M. albus white sweet-clover

Robinia pseudoacacia black locust

Vicia benghalensis purple vetch; *V. sativa* ssp. *nigra* narrow-leaved vetch*; V. s.* ssp. *sativa* spring vetch

Lamiaceae

Mentha spicata spearmint

Lamium amplexicaule henbit, dead-nettle

Marrubium vulgare horehound

Lythraceae

Lythrum hyssopifolium common loosestrife

Malvaceae

Lavatera cretica

Malva parviflora cheeseweed; *M. nicaeensis* bull mallow

Onagraceae

Gaura drummondii gaura

Oxalidaceae

Oxalis corniculata creeping wood-sorrel; *O. pes-caprae* Bermuda buttercup

Plantaginaceae

Plantago lanceolata English plantain; *P. major* common plantain; *P. ovata*

Poaceae

Arundo donax giant reed
Avena barbata; A. fatua wild oats
Bromus madritensis Madrid brome*; B. diandrus* ripgut brome*; B. hordeaceous* soft chess
Cortaderia selloana; *C. atacamensis* pampas grass
Cynodon dactylon bermuda grass
Dactylis glomerata orchard grass
Erharta erecta
Festuca arundinacea tall fescue
Hainardia cylindrica thin tail
Hordeum murinum foxtail barley; *H. marinum* ssp. *gussoneanum* Mediterranean barley
Lamarckia aurea goldentop
Lolium multiflorum Italian ryegrass*; L. perenne* English ryegrass; *L. temulentum* darnel
Parapholis incurva sickle grass
Pennisetum clandestinum Kikuyu grass
Phalaris aquatica Harding grass
Phalaris minor Mediterranean canary grass; *P. paradoxa* hood canary grass
Piptatherum miliaceum smilo grass
Poa annua annual bluegrass
Polypogon interruptus ditch beard grass; *P. monspeliensis* rabbitsfoot grass
Schismus arabicus Mediterranean grass; S. *barbatus* bearded Mediterranean grass
Vulpia bromoides brome fescue; *V. myuros* foxtail fescue

Polygonaceae
Polygonum arenastrum common knotweed; *P. argyrocoleon* Persian knotweed
Rumex acetosella sheep sorrel
Rumex crispus curly dock; *R. pulcher* fiddle dock; *R. conglomeratus* green dock

Portulacaceae
Portulaca oleracea common purslane

Primulaceae
Anagallis arvensis scarlet pimpernel

Rubiaceae
Galium aparine cleavers

Scrophulariaceae
Verbascum thapsus common mullein
Veronica anagallis-aquatica water speedwell

Solanaceae
Nicotiana glauca tree tobacco

Urticaceae
Urtica urens dwarf nettle

Appendix G: Fiscal Year 2001 Biological Inventory Projects

Fiscal Year 2001 Biological Inventory Projects for the Mediterranean Coast Network – Project Descriptions and Budgets

Project III.B.1: ***Review and compile existing information (all parks).***

Fiscal Year(s) of Implementation: 2001

Inventory Objective and Rationale: The first step in inventorying vascular plants is to use existing information to improve knowledge of presence, distribution, and abundance estimates of all plant species for all three parks. During the first stage of this inventory, much existing information was gathered and entered into the NPSpecies database. Workshop participants assessed this information and identified problems and information gaps and, where possible, existing sources to fill those gaps. These information gaps and information sources vary for each park.

Cabrillo National Monument (CABR) has no evidenced plant records listed in the NPSpecies database. However, voucher specimens reside at San Diego State University (SDSU), Santa Barbara Botanic Garden (SBBG) and the San Diego Natural History Museum (SDNHM). These voucher specimens need to be accessed and all of their information transferred into the NPSpecies database.

Channel Islands National Park (CHIS) has a majority of its plant records evidenced. However, a subset of species (approximately 150-200 plant species) need to be searched for at the SBBG, Rancho Santa Ana Botanic Garden (RSABG), and University of California, Los Angeles (UCLA). Also there are additional records for CHIS (helicopter survey, Wallace database) that need to be entered into the NPSpecies database as well as other park databases.

There is a published flora (now out of print) for the Santa Monica Mountains and voucher specimens reside at the UCLA herbarium. This flora serves as the primary source for the Santa Monica Mountains National Recreation Area (SAMO) NPSpecies database. However, the flora evolved and was published as a "working" document. Information was not always systematically compiled and the completeness of the voucher collection is not known. Since publication in 1986, over 60 new species additions and 40 otherwise noteworthy collections have been reported. A number of collections remain unresolved as to species identity. The reported new species have been added to the NPSpecies database, however, published or formally vouchered evidence does not exist for these records. In addition, SAMO extends into the Simi Hills, north of the Santa Monica Mountains and this area was not included in the published flora. Some additional species found in the Simi Hills have been added to the NPSpecies database based on information gathered at the inventory workshop, but no published or vouchered evidence exists for these records. Local experts should be consulted to determine additional species which may be present in the Simi Hills. Systematic compilation of this existing expert knowledge will likely also result in (1) identification of specimens to be processed (see *Project III.B.2*) and (2) need for a limited amount of field survey to collect underrepresented voucher specimens and assess completeness of resulting inventory.

Abundance and distribution information is needed for all three parks. At CHIS and CABR, analysis of existing monitoring data will provide abundance estimates for most species. Consultation with field experts will fill in information for remaining species. At SAMO, the abundance and distribution information contained in the existing flora (published in 1986) is inconsistent, out of date and incomplete. Again, local experts will be able to provide current information on abundance categories and general distribution for most species – both for the Santa Monica Mountains and the Simi Hills.

Completing the data gathering and compilation summarized above will fill in many of the identified knowledge gaps in a cost-effective manner and efficiently guide future field work where existing knowledge is not sufficient to meet overall network objectives.

Methods: This project is divided into four sub-projects to be undertaken concurrently: a) *Herbaria searches*, b) *Data conversion for incomplete CHIS databases*, c) *Analyze monitoring data for CABR*, and d) *Verify and expand plant species information for the Santa Monica Mountains and Simi Hills through a cooperative agreement*. Details of the methods for this project are described below. Cost estimates are included below the descriptions for each of the four sub-projects. Details of these cost estimates may be found in Table 11.

a) *Herbaria searches*. Improve species presence information for CHIS and CABR by conducting collaborative searches at various herbaria. For CABR, herbaria searches for all species will be conducted at SDSU, SDNHM, and SBBG. For CHIS, herbaria searches for a specific list of approximately 150-200 species will be conducted at SBBG, RSAGB, and UCLA. The CHIS list of species will focus on those found on Anacapa, San Miguel, and Santa Rosa Islands that are not listed in the Santa Cruz Island Flora or the Santa Barbara Island Flora. Results from the initial herbaria searches will determine whether additional herbaria should be searched. Other possible herbaria include Jepson Herbarium, and herbaria at California State University, Northridge (CSUN), University of California, Berkeley, and Stanford University. In addition, other data sources such as CalFlora and individual researchers and local experts who have conducted studies in a park or have knowledge regarding a park's flora will be consulted. All information and voucher records obtained through the herbaria searches and consultation will be entered into park databases and NPSpecies.

For SAMO, herbaria searches will be conducted at UCLA and RSAGB as part of sub-project *(d) Verify and expand plant species information for the Santa Monica Mountains and Simi Hills through a cooperative agreement*, described below. However, searches at the SBBG and other herbaria which are expected to contain only a limited number of Santa Monica Mountains specimens will be conducted by the technician or contractor searching these herbaria for CHIS and CABR.

For this portion of this project, the work for all three parks will be completed by hiring a GS-7 Biological Technician (plants) for approximately five months or by contracting the project.

Expert Contacts: Steve Junak, SBBG; Kathryn McEachern, USGS-BRD; Adrienne Russell, Mike Simpson, SDSU; Mitch Beauchamp, Pacific Southwest Biological Services

Estimated Time to Complete: 5 months
Estimated Cost: $ 25,497

b) *Data conversion for incomplete CHIS databases*. Additional species presence information for CHIS will be obtained by converting existing databases into a usable form. Helicopter surveys of Santa Rosa Island were conducted in 1998. The data have been partially entered into GIS but additional work

needs to be done. This project will include entering additional tabular data into Microsoft Access, then transferring polygons to maps and digitizing them into the park's GIS. This portion of the project will also include conversion of the existing CHIS flora (Gary Wallace, 1980) into computerized database.

The network will hire a GS-5 level Biological Technician to work for three months to complete these tasks. Supervision and project management will be provided by park staff and by Gary Wallace.

Expert Contacts: Steve Junak, SBBG; Kathryn McEachern, USGS-BRD; Adrienne Russell, Mike Simpson, SDSU; Mitch Beauchamp, Pacific Southwest Biological Services; Gary Wallace

Estimated Time to Complete: 3 months
Estimated Cost: $ 7,275

c) *Analyze monitoring data for CABR.* Vegetation community monitoring data collected at CABR will be analyzed to obtain abundance estimates and correlate with or translate to NPSpecies abundance categories. Field experts will be consulted to assess analysis results and determine abundance for species not captured in the monitoring program. The analysis work will be conducted by USGS-BRD Ecologist Kathryn McEachern as part of her normal workload. A GS-7 level Biological Technician would be hired to assist with data management and the fitting off the statistical results to NPSpecies abundance categories. This portion of the project should be completed within one month.

Expert Contact: Kathryn McEachern, USGS-BRD

Estimated Time to Complete: 1 month
Estimated Cost: $ 5,562

d) *Verify and expand plant species information for the Santa Monica Mountains and Simi Hills through a cooperative agreement.* For SAMO, species information in the current flora needs to be verified, updated and expanded to include the Simi Hills region. Presence/absence, abundance and distribution data need to be improved.

Through expert knowledge and consultation with local botanists, a cooperator will research, obtain, and compile critical information on (1) new species occurrences in the Santa Monica Mountains, (2) species presence in the Simi Hills, an area not covered by the Santa Monica Mountains flora, and (3) revised and updated abundance and distribution information for all species for SAMO. During the course of this work, an inventory and evaluation of voucher specimens in the UCLA herbarium will be made. The RSABG herbarium will be also be searched for additional vouchers. Searches at the SBBG and other herbaria which are expected to contain only a limited number of Santa Monica Mountains specimens and will be conducted by the technician or contractor searching these herbaria for CHIS and CABR (see subproject *Herbaria searches*). The voucher inventory will focus on uncommon and rare taxa as determined by consultation with expert consultants. Collection and processing of unvouchered specimens will be performed as described in *Project III.B.2, Project III.B.3* and *Project III.B.4*. Species requiring field surveys will be identified and surveys will be conducted in out years as described in

Project III.B.3, Project III.B.4 and *Project III.B.5*. Survey work outside the scope of these projects will be performed by SAMO staff, interns and volunteers.

It was agreed by all SAMO consultants at the inventory workshop that the most efficient and reliable way to compile the information necessary to complete this project is through a cooperation with UCLA.

Expert Contacts: Barry Prigge, Phil Rundel, Arthur Gibson, UCLA; Carl Wishner, Envicom Corporation; Rick Burgess, California Native Plant Society; David Hollombe; Suzanne Goode, CDPR; Chester King; Mary Meyer, CDFG; Rick Riefner; Tim Thomas, USFWS

Estimated Time to Complete: 12 months
Estimated Cost: $ 38,875

Project III.B.1 Total Estimated Time to Complete: 12 months
Project III.B.1 Total Estimated Cost: $ 77,209

Table 11. Detailed budget summary for *Project III.B.1: Review and compile existing information (all parks).*

ITEM DESCRIPTION	COST
Herbarium searches	
Personnel Salaries	
Technician, GS-7(4) 120 days (~ 6 months)	$ 22,272
Direct Costs	
Transportation	
Vehicle Rental – 10 days @ $ 40 per day	$ 400
Travel	
Per Diem – 15 days @ $ 145 per day	$ 2,175
Vehicle Mileage – 2000 miles @ $ 0.325 per mile	$ 650
Subtotal:	***$ 25,497***
Data conversion for incomplete CHIS databases	
Personnel Salaries	
CHIS – Technician, GS-5 temporary 60 days (~ 3 months)	$ 6,625
Direct Costs	
Travel	
Vehicle Mileage – 2000 miles @ $ 0.325 per mile	$ 650
Subtotal:	***$ 7,275***
Analyze monitoring data for CABR	
Personnel Salaries	

Technician, GS-7(4) 20 days (~ 1 month)	$ 3,712
Direct Costs	
Transportation	
Vehicle Rental – 10 days @ $ 40 per day	$ 400
Travel	
Per Diem – 10 days @ $ 145 per day	$ 1,450
Subtotal:	***$ 5,562***
Verify and expand plant species information for the Santa Monica Mountains and Simi Hills through a cooperative agreement	
Personnel Salaries	
University Botanist (6 months)	$ 26,000
Overhead	$ 7,800
Consultant Time 50 hours @ $ 95 per hour	$ 4,750
Direct Costs	
Travel	
Vehicle Mileage – 1000 miles @ $ 0.325 per mile	$ 325
Subtotal:	***$ 38,875***
Project III.B.1 Subtotal:	**$ 77,209**

Project III.B.2: **Identify, collect and process voucher specimens (all parks).**

Fiscal Year(s) of Implementation: 2001, 2002, 2003

Inventory Objective and Rationale: All three parks currently house or have access to unprocessed plant specimens. Until these specimens are processed, they do not contribute any information to the knowledge base concerning the plant species present within each of the parks. Processing these plant specimens will greatly improve the database with respect to the presence, distribution, and abundance estimates of all plant species within each park. For CHIS, there are approximately 125 new or noteworthy specimens collected from Santa Rosa Island in 1998. Most of these records reside at the SBBG and need to be accessed and processed. Specimens also reside at the SBBG for CABR; these records will also need to be accessed and processed. For SAMO, the Simi Hills have never been formally surveyed. We expect that during *Project III.B.1*, experts will identify specific areas to be surveyed for additional species. For all three parks, further voucher specimens will need to be collected and processed for known and underrepresented species, as well as for any new species found.

***Methods*:** Finish processing existing dried specimens and collect additional voucher specimens for underrepresented species at all three parks. Three phases of work will be involved to complete this

project. This work will be done by a contracted GS-7 level botanist.

Phase 1: Access and process existing specimens. Approximately 50 specimens reside at CHIS, with an additional 75 at SBBG. CABR has approximately 60 specimens at SBBG that need to be processed. Park staff estimate that SAMO will require processing of about 100 specimens.

Phase 2: Identify species that need additional voucher collections. The inclusion of voucher specimens acquired during Phase 1, coupled with the results of herbaria searches and consultation with local experts initiated under *Project III.B.1,* will help to identify additional specimens that need to be collected and processed. Additionally, these results will likely identify areas (i.e. the Simi Hills) that need to be surveyed.

Phase 3: Collect and process specimens of species identified during Phase 2. Specimen collection will be done in conjunction with *Projects III.B.3* and *Project III.B.4* at all three parks. Additionally, underrepresented specimens at CABR will be collected during wandering surveys, particularly those in selected habitats, and conducted as part of *Projects III.B.3* and *Project III.B.4* to document species occurrences. Digital photos of each species in question will be taken.

Expert Contacts: Steve Junak, SBBG; Carl Wishner, Envicom Corporation; Tim Thomas, USFWS; David Hollombe; Rick Burgess, California Native Plant Society; Kevin Cummins, UCSB; Adrienne Russell, Mike Simpson, SDSU

CABR and CHIS
Estimated Time to Complete: 3 years (2-3 months per year*)*
***Estimated Cost*:** $ 13,800

SAMO
Estimated Time to Complete: 3 years (1-2 months per year)
***Estimated Cost*:** $ 8,325

Project III.B.2 Total Estimated Time to Complete: 3 years
Project III.B.2 Total Estimated Cost: $ 22,125

- **Total Cost FY2001: $ 12,187**
- **Total Cost FY2002: $ 4,969**
- **Total Cost FY2003: $ 4,969**

Table 12. Detailed budget summary for *Project III.B.2: Identify, collect and process voucher specimens (all parks) – year 1.*

ITEM DESCRIPTION	COST

Personnel Salaries	
Technician (NPSpecies), GS-7(4) 20 days (~ 1 month)	$ 3,712
Consultant Time 20 days @ $ 200 per day	$ 4,000
Direct Costs	
Processing	$ 2,700
Travel	
Per Diem – 10 days @ $ 145 per day	$ 1,450
Vehicle Mileage – 1000 miles @ $ 0.325 per mile	$ 325
Project III.B.2 Subtotal:	**$ 12,187**

Project III.D.1: **Document bird species checklists (all parks).**

Fiscal Year(s) of Implementation: 2001

Inventory Objectives and Rationale: To improve knowledge and documentation of the presence or absence of bird species in all three parks based on information provided in existing checklists. Generally, checklist information appears fairly accurate in terms of potential species occurrences. However, little or no information is provided on checklists regarding formal documentation of species in the parks. This project will address this problem by using the checklist information as a basis for compiling documentation for each species. By searching museum records, universities, and other institutions, and interviewing regional experts, presence/absence data for bird checklists will be documented and this information entered into NPSpecies.

Methods: For each park, bird species checklist information will be documented by assessing museum records, universities, and other institutions (e.g. Western Foundation of Vertebrate Zoology (WFVZ)). Regional experts will also be contacted for information on bird species presence/absence in each park. The goal of this effort will not be to add species, but rather to compile the documentation for those already on the lists. Documentation will be based on published sighting records or other "formal" documentation (e.g. field notes maintained as part of museum records, species checklists based on field observations, Breeding Bird Atlas data, etc.). An attempt will be made to locate the most recent documented observation for each species and enter this information into NPSpecies. For rare and sensitive species, historic information and distribution will also be obtained and linked to *Project III.D.2* for sensitive bird species (see below). For all species, information on voucher specimens will be obtained and entered into NPSpecies. The ultimate products for this project will be up-to-date bird checklists for each park, with associated documentation for each species on the checklist.

To implement this project, the network could hire a technician, graduate student, or contract for the

necessary services. An individual compiling data for this project would be required to visit local institutions, evaluate museum records, and interview ornithologists. Information on bird presence/absence would be entered into NPSpecies and park-specific databases. Distribution information for rare and sensitive species would be entered into an associated GIS database. It is expected that project could be completed over a four to six month period. As a top priority project necessary to meet minimum NPS inventory requirements, it is recommended that the work be implemented in fiscal year 2001.

Expert Contacts: Larry Allen, L.A. Breeding Bird Atlas; Walter Wehtje, WFVZ; Walter Sakai, Santa Monica College; Dan Cooper, Audubon Society; Paul Collins, SBMNH; Hartmut Walter, UCLA; Kimball Garrett, LACMNH; Phil Unitt, SDMNH; Claude Edwards; Guy McCaskie.

Estimated Time to Complete: 12 months
Estimated Cost: $ 23,175

Table 13. Detailed budget summary for *Project III.D.1: Document bird species checklists (all parks).*

ITEM DESCRIPTION	COST
Personnel Salaries	
Technician, GS-7 80 days (~ 4 months)	$ 13,500
Direct Costs	
Contract with Santa Barbara Museum of Natural History	$ 7,500
Transportation	
Vehicle Rental – 10 days @ $ 40 per day	$ 400
Travel	
Per Diem – 10 days @ $ 145 per day	$ 1,450
Vehicle Mileage – 1000 miles @ $ 0.325 per mile	$ 325
Project III.C.1 Subtotal:	**$ 23,175**

Project III.E.1: **Survey reptiles and amphibians (all parks).**

Fiscal Year(s) of Implementation: 2001, 2002

Inventory Objective and Rationale: To determine the distribution and status of reptile and terrestrial amphibian populations at all three parks, and conduct a comprehensive inventory for these species. The installation of pitfall trap arrays will be used to conduct the field sampling. In CABR, arrays have already been installed and funds will be used to continue the inventory effort at existing arrays. In SAMO, new arrays will be installed in FY2001 to complement arrays already installed by the park in

FY2000. In CHIS, arrays (if necessary and feasible) will be installed in FY2002.

Methods: To sample terrestrial reptiles and amphibians, pitfall trap arrays will be installed in representative habitats throughout the parks. Sampling protocols will follow those developed by Robert Fisher of the USGS-BRD and already implemented throughout other areas of southern California. This type of pitfall trap sampling has been demonstrated to be an extremely comprehensive, accurate, and systematic method for sampling reptiles and amphibians in the region (Case and Fisher, 2000). Research has also indicated that the arrays are effective at sampling species that are nocturnal, fossorial, or cryptic (Case and Fisher, 2000).

Each pitfall trap array consists of seven five-gallon buckets used as pitfall traps, connected by shade cloth drift fences (15 meter arms), in the shape of a "Y". The drift fences help direct reptiles and amphibians into the buckets (the traps also allow sampling of some small mammal species and macroinvertebrates). Funnel traps are incorporated into the design to capture larger snakes that can typically escape the five-gallon pitfall traps.

Work to be conducted at SAMO

The Santa Monica Mountains have been divided into four sampling regions for the purpose of stratifying pitfall trapping sites across varying habitats and to include regions variously affected by human activities. In each sampling region, 20 arrays will be installed. The sampling regions are:

- Simi Hills – north of US-101 Freeway
- Western Region – including Point Mugu State Park and Circle X Ranch
- Central Coastal Region – including coastal habitats and hillsides which are not part of the Malibu Creek Watershed
- Malibu Creek Watershed – south of US-101 Freeway

The regions represent four ecological units, each with a distinct set of characteristics. The Simi Hills are separated from the rest of the Santa Monica Mountains by the 101 Freeway. Most of this region is privately owned and highly impacted by urban development and associated influences. The Western Region is primarily public land and is relatively undeveloped. This region is the most "pristine" among the four sampling units. The Central Coastal Region includes a number of relatively small watersheds that drain into the ocean from the south-facing slope of the Santa Monica Mountains. Substantial amounts of coastal sage scrub and other coastal vegetation types make this sampling region unique. Finally, the Malibu Creek Watershed is unique in that it is the largest watershed in the mountain range and is the only watershed that cuts through the mountains. There are many impacts in the Malibu Creek Watershed including non-point source pollution, exotic species introductions, habitat destruction, and changes in hydrology.

The 20 arrays installed in each sampling region will be stratified across vegetation types to ensure complete sampling of habitats in each region. Specific site selection will be conducted in cooperation with USGS-BRD researchers, NPS biologists, and other cooperators. GIS data on vegetation and

habitat distribution will be used to aid in site selection across the sampling areas.

Installation of arrays will occur in early FY2001. Actual sampling will be initiated soon after installation of individual arrays. USGS-BRD researchers will work with NPS biologists, interns, students, university researchers, and other agency cooperators to install and monitor the sites. Sites will be sampled for 10 days once every two months for one year.

Expert Contacts: Lee Kats, Tom Vandergone, Pepperdine University; Gary Busteed, NPS and CSUN; Seth Riley, NPS; Robert Fisher, USGS-BRD

Work to be conducted at CABR

Pitfall trapping efforts are already underway at CABR in cooperation with the USGS-BRD. In particular, 17 arrays have been installed at CABR and adjacent lands of the PLER. These sites are currently being sampled by NPS biologists, volunteers, and USGS-BRD researchers. Funds from the biological inventory project will be used to continue monitoring these sites to achieve inventory objectives. In addition, other directed searches will be implemented to further evaluate the presence of species not expected from the pitfall trap arrays.

Expert Contact: Robert Fisher, USGS-BRD

Work to be conducted at CHIS

For CHIS, Santa Cruz, Santa Rosa and San Miguel Islands are the primary sampling regions and reptile and amphibian surveys will be focused in representative habitats of these three islands. Of these islands, Santa Cruz and Santa Rosa are the highest priority and will require the greatest sampling effort. San Miguel Island has more herpetological data than the other two islands, but has introduced black rats, which likely affect reptile and amphibian populations. Sufficient herpetological surveys have already been completed on Anacapa and Santa Barbara Islands.

In FY 2001, detailed methods will be determined to most effectively sample the reptiles and amphibians on the islands given the existing data available and the environmental constraints of establishing arrays at CHIS. Assuming that pitfall trap arrays are utilized, an approximate sampling effort of the following has been estimated, stratified among habitat types: East Santa Cruz Island, 10 arrays; West Santa Cruz Island, 20 to 30 arrays; Santa Rosa Island, 20 to 30 arrays; San Miguel Island, 10 arrays. On Santa Cruz and Santa Rosa Islands, surveys would include marking gopher snakes to get absolute abundance estimates. Surveys would be conducted for seven days every two months for one year.

Expert Contacts: Robert Fisher, USGS-BRD; Paul Collins, SBMNH; Charles Drost, USGS-BRD

Project III.E.1 Total Estimated Time to Complete: 2 years
Project III.E.1 Total Estimated Costs (all parks, both years): $ 91,871

- **Total Cost FY2001(SAMO and CABR): $ 33,573**
- **Total Cost FY2002 (CHIS): $ 58,298**

Table 14. Detailed budget summary for *Project III.E.1: Survey reptiles and amphibians (all parks) – year 1*.

ITEM DESCRIPTION	COST
Personnel Salaries	
Technician, GS-7 120 days (~ 6 months)	$ 20,148
Direct Costs	
Pitfall Trap Supplies	
SAMO – 20 Arrays @ $ 300 per array	$ 6,000
Directed searches at CABR for species not captured in pitfall trap arrays	$ 2,500
Transportation	
GSA Vehicle	$ 2,750
Travel	
Per Diem	
SAMO – 15 days @ $ 145 per day	$ 2,175
Project III.E.1 Subtotal:	**$ 33,573**

Project III.F.1: **Review and compile existing information (all parks).**

Fiscal Year(s) of Implementation: 2001

***Inventory Objectives and Rationale*:** To improve knowledge of presence, distribution, and abundance estimates of all fish species for all three parks. During the first stage of this inventory, some existing information was gathered and entered into the NPSpecies database. Workshop participants assessed this information and identified problems and information gaps and, where possible, existing sources to fill those gaps. The information gaps and information sources vary for each park.

CABR has few fish records with evidence in the NPSpecies database. Voucher specimens reside at Scripps Institute of Oceanography and possibly the Los Angeles County Museum of Natural History (LACMNH) and SDSU. Voucher specimens need to be assessed for location details and entered into the NPSpecies database. CHIS has a small percentage of fish records with evidence. Collections at LACMNH , SDMNH and UCSB need to be searched. Searches may lead to additional repositories of smaller, but important collections. More than half of the fish records are evidenced for SAMO. Additional searches at the LACMNH, California Academy of Sciences and other institutions will uncover additional evidence for fishes in SAMO streams and lagoons.

Completing the data gathering and compilation summarized above will fill in many of the identified knowledge gaps in a cost-effective manner and efficiently guide field work where existing knowledge is not sufficient to meet overall network objectives.

***Methods*:** To improve presence information, collaborative searches will be conducted for all three parks at various institutions (e.g. Scripps Institute of Oceanography, UCSB, Santa Barbara Museum of Natural History (SBMNH), LACMNH, SDMNH, California Academy of Sciences). Results will determine whether limited additional searches at more distant institutions are needed (e.g. University of Michigan).

The work for all three parks could be completed by hiring a GS-7 Biological Technician for approximately 4 months or, alternatively, by contracting the entire project.

***Expert Contacts**:* Cindy Klepaldo, Scripps Institute of Oceanography; Gary Davis, NPS; Camm Swift, LACMNH, retired; Milton Love, Jack Engle, UCSB; Mike Shane, HUBBS-Sea World Research Institute; Dan Pondella, Occidental College

***Estimated Time to Complete**:* 4 months
***Estimated Cost**:* $ 15,675

Table 15. Detailed budget summary for *Project III.F.1: Review and compilation of existing (fish) information (all parks).*

ITEM DESCRIPTION	COST
Personnel Salaries	
Technician, GS-7 80 days (~ 4 months)	$ 13,500
Direct Costs	
Transportation	
Vehicle Rental – 10 days @ $ 40 per day	$ 400
Travel	
Per Diem – 10 days @ $ 145 per day	$ 1,450
Vehicle Mileage – 1000 miles @ $ 0.325 per mile	$ 325
Project III.F.1 Subtotal:	**$ 15,675**